School Shop

Vol. XX No. 7

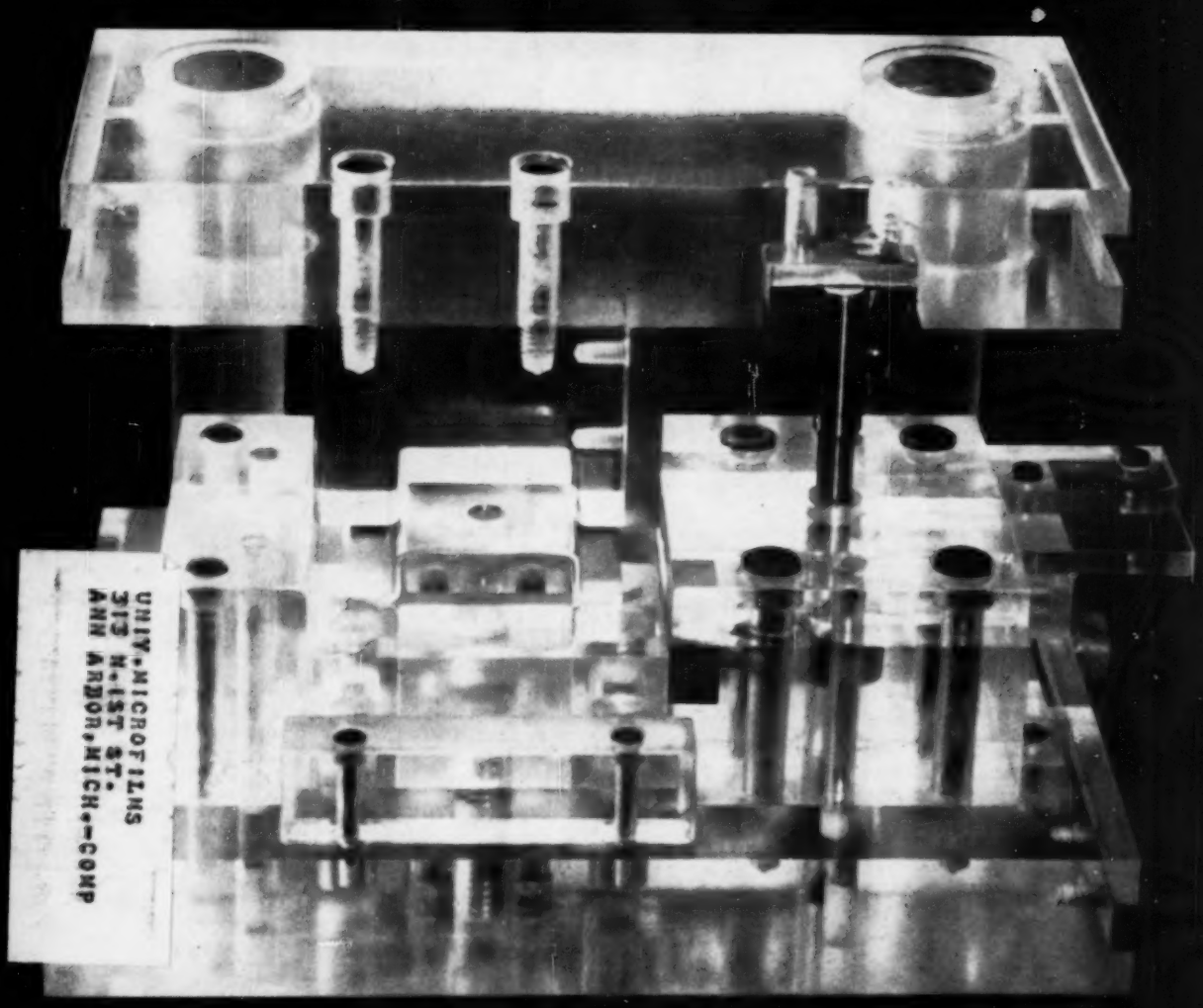
MARCH 1961

Rediscovering Industrial Arts
by William R. Mason

An Abacus
by Glenn Dickerson

A Safety Lesson
by Clarence W. Lubbe

Cover story: The photo below presents a unique teaching aid which shows how a die machine pierces, cuts off, and forms. Starting on page 11 is an article that tells how one of these devices can be built. Included are photographs and the necessary working drawings.



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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Frontiers in Industrial Education

The world does change in spite of all that the schools do to slow up the rate by acting as though things were pretty much the same. In fact, the whole nature of our American society has been going through a metamorphosis that is shocking to many and resisted by others, but the inexorable movement continues.

Here are a few of the many changes in the nature of our society that are taking place, or are in the process, at the moment:

1. Now we are an urban or a semi-urban nation with a completely predominant industrial economy.

2. We are a nation of double breadwinners. Wives are members of the working force in areas far broader than the traditional teaching, office work, nursing occupations for women.

3. People are mobile and much better informed. Roots are no longer deep and permanently imbedded. Magazines, newspapers, radio, and TV are found everywhere.

4. Our acquisitive culture is showing some slight evidence of rebellion against some of the traditional status symbols such as the overly large automobile.

While the social scientist would undoubtedly point out many other areas of social change that are taking place, these are listed for purposes of contrast with the nature of industrial education as it is generally thought of in our school sysems.

Much of the content of industrial education is still geared to the glue pot instead of the electron or the molecular structure of metals or the cell formation in various kinds of woods. The "why" behind the manipulative aspects of industrial education is mostly ignored.

Girls and women are still given little attention in industrial education in spite of their rapidly increasing invasion of the working world, especially in the field of technology. Schools still act as though all women are exclusively homemakers and all men are solely breadwinners, as witness the traditional split with boys taking industrial arts while girls take home economics. Yet in adult life the likelihood is that each will have important responsibilities in both areas.

In most industrial-education classrooms, opportunities for creativity of various kinds and the problem-solving approach to shop activity are seldom found. Here are two areas in which work is needed in depth.

Then there is that old complaint about standards of craftsmanship as well as standards of skill being too low. Upgrading in both is sorely needed as is more depth of understanding on the part of students and shop teachers of industrial processes and operations.

The sophisticated society in which we live calls for different approaches than the traditional ones which the various fields of industrial education pretty generally take. There are frontiers that have been explored by the more daring in industrial education, some of which have been mentioned above.

Primarily, what industrial education needs is a sense of timeliness, of urgency in meeting the changing social, economic, and cultural scene. Both industrial-arts and trade education cannot long exist if they mirror a type of industrial complex that has long since changed. The ferment in other subject-matter areas, such as science and foreign languages, that is brewing so noisily in public is evidence of the pressure of social change. This pressure was not and is not entirely welcomed by all segments of the science and foreign-language areas, nor was it anticipated by most of them. The exigencies of circumstance forced a reappraisal. Who knows but that the lightning will next strike industrial education?

The social revolution is all around us. The time has come for industrial education to catch up. What it takes is imagination, drive, and a will to experiment—all qualities that we have but need to exercise more vigorously.

—*L.W.P.*

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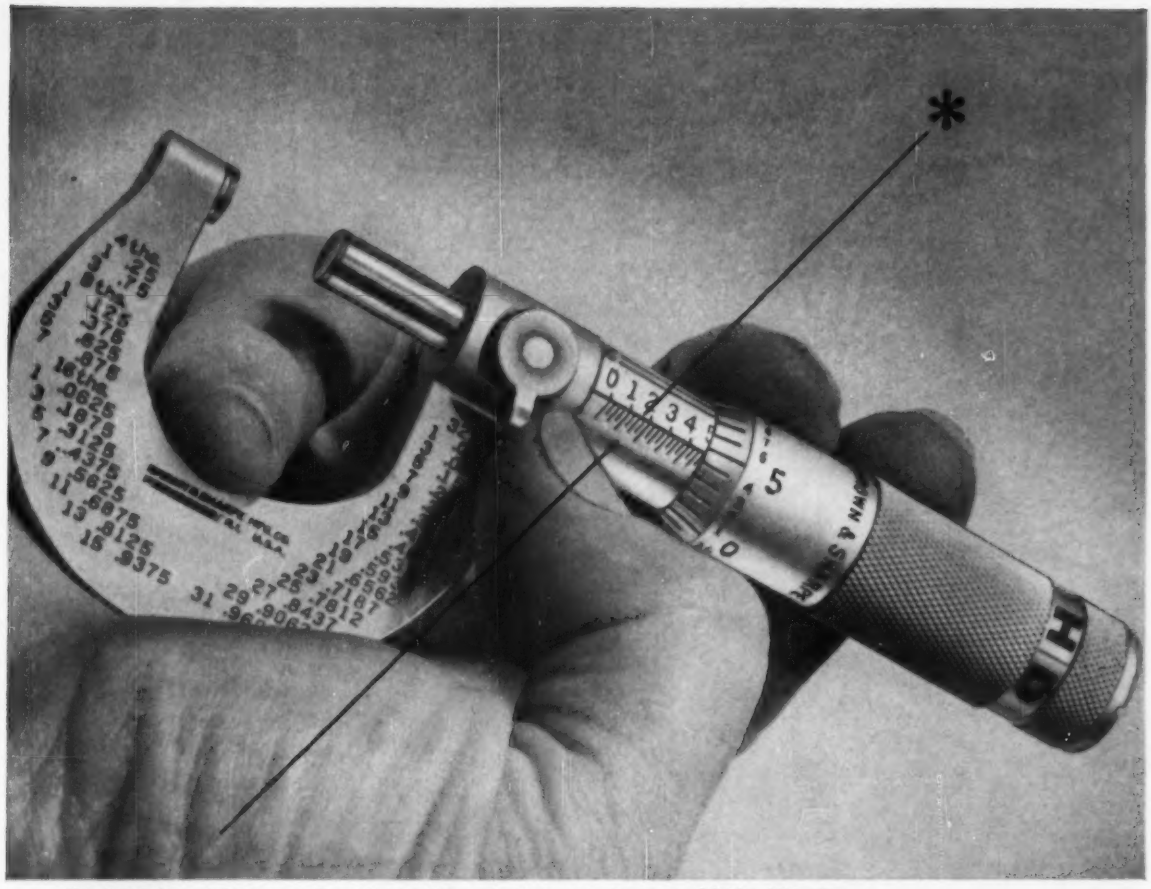

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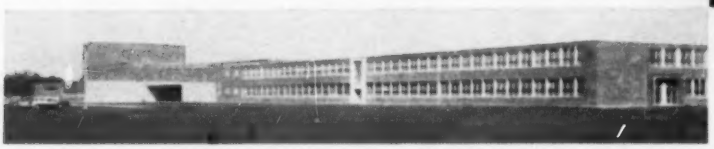

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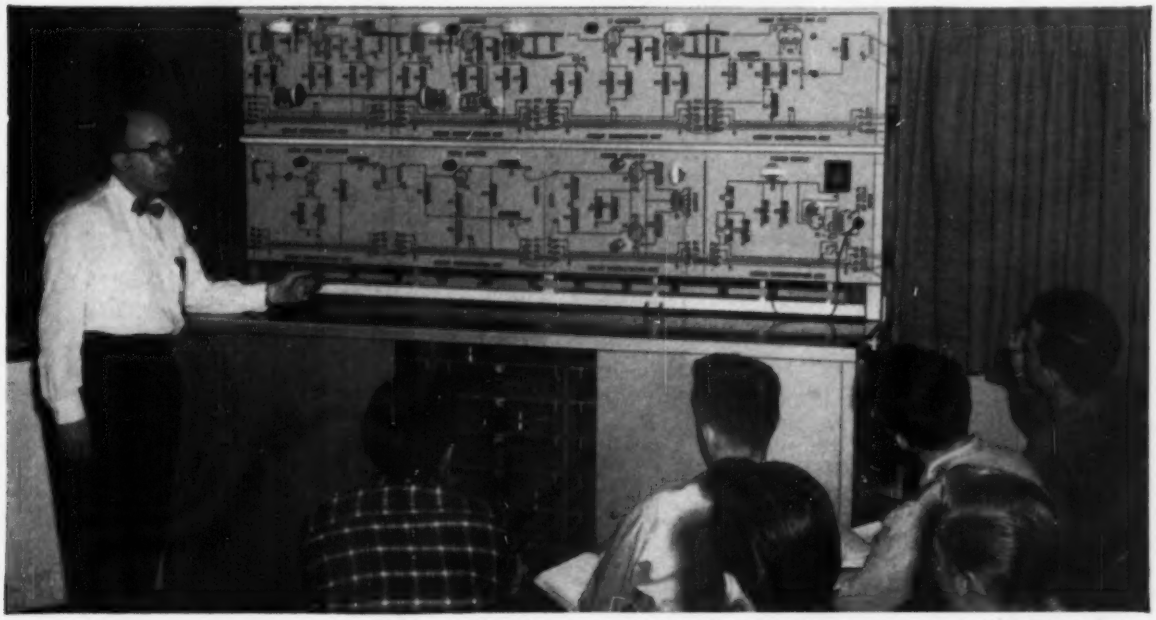

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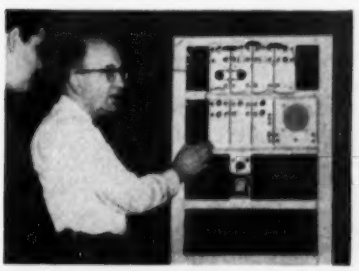

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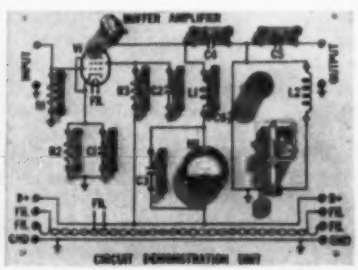

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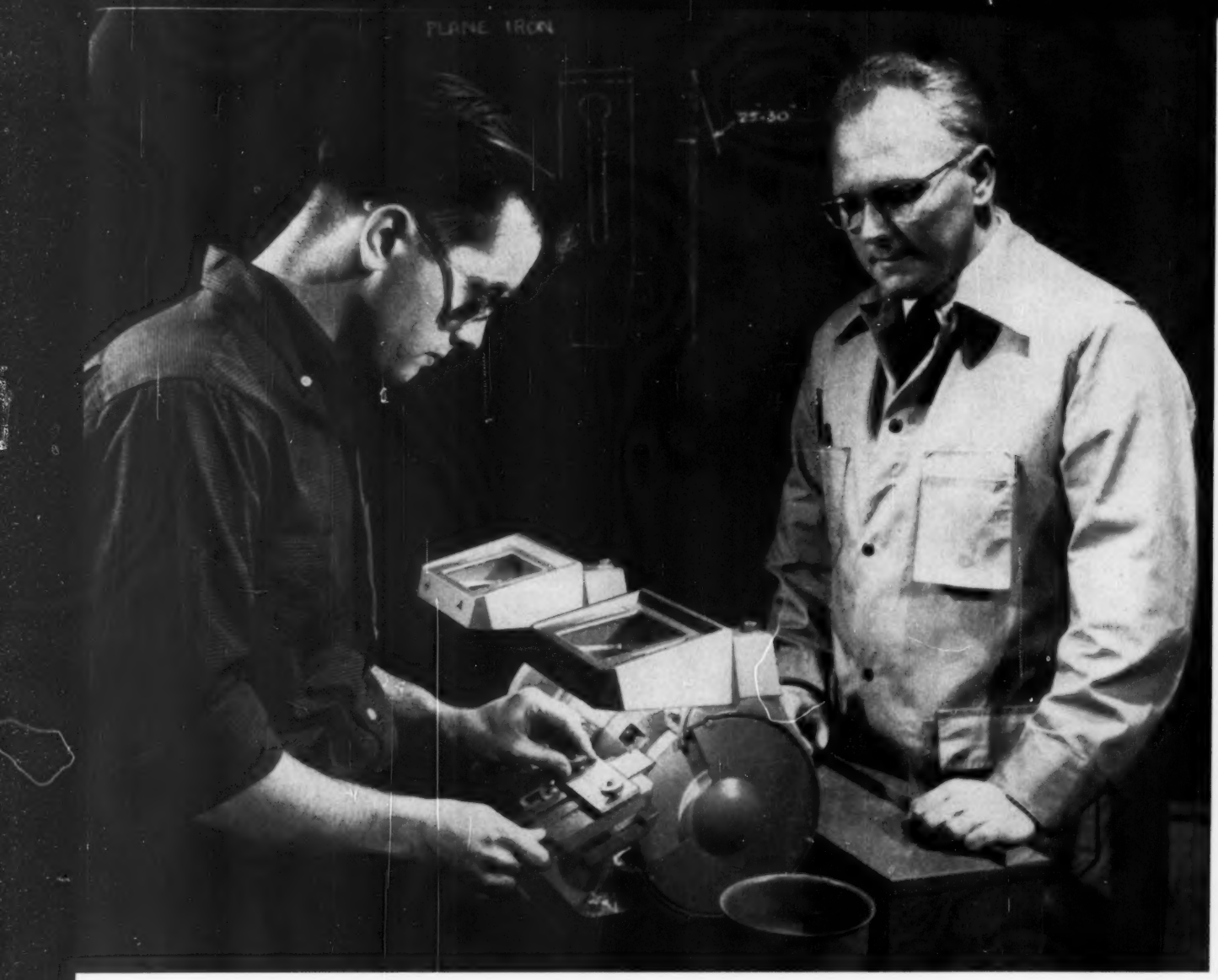

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Rediscovering the Unique Contributions of Industrial Arts

By William R. Mason

Supervisor of Industrial Arts,
Cleveland, Ohio, Public Schools

MANY, many years ago, when industrial arts was manual training, meetings of teachers to exchange ideas were common. Discussion usually centered around what courses should be taught and what projects should be used in the shops. The primary interest then was skill development. Math was math, science was science, and neither met manual training – at least not in the shop classes. The name itself – manual training – emphasized the objectives of that time of yore: basic training in manual pursuits. Being unique was accepted as the right of each curriculum area.

As time passed, shop work changed. Design became a concern of the shop program. Beauty reared its delightful head in our concept of shop work, and very soon the name was changed to point out to the tyros – those outside of, as well as inside of, the shops – that now the emphasis was on art. Thus, manual training became manual arts. It was still basically manual, though, but everyone was pleased for the moment with the combination of manipulative skills and beauty, or art, as a basis for a shop course.

More time passed, and great industrial developments were taking place all around the manual-arts teachers. Teachers asked themselves the very logical and timely question:

"Why not capitalize on this industrial interest and teach our students about products, processes, and materials of industry?" You're right. The emphasis switched so that "manual" went by the boards, "arts" remained so that we now have "industrial arts."

Shop teachers took to the new name immediately. Industrial arts had prestige, it sounded dignified, it smacked of educational status. Unfortunately, more time was spent bantering about new names for courses rather than in explaining what the courses were all about. Consequently, the public – taxpayers, if you please – who were never made to understand and know what industrial arts is, still conceive of it as manual training. Likewise, industrial arts is confused with industrial design.

Courses have been renamed, too, but who, aside from educators, knows what a laboratory of industry is supposed to be; where communication, transportation, power, and graphics are taught? What on earth is "communication" anyway? A speech course? "Transportation" could mean any method of conveying. Webster's *Unabridged Dictionary* contains more than a foot of definitions for "power." We are no longer unique today. At least, people understand that what we teach is unique – unique to our curriculum area, that is.

As we noted industrial changes, we decided to adapt them to our program. We also recognized that math, science, and the economics of living were tied in closely to industry. So, then we began to use math and science in our shops, and we started to think of ourselves as math and science teachers. It is not unusual to find claims today that we teach physics, chemistry, social sciences, English, and other subjects as phases of industrial education. It is not surprising, therefore, that we have lost our subject identity by these claims. We are jacks of all areas and masters of what? It is not unusual, either, since many of us make the aforementioned claims, that academically trained guidance people should steer slow learners into the shops for repeat doses of academic work. What this all means is that we have so conscientiously and diligently tried to present ourselves as a part of general education that we are often thought of as a service department to other departments. We are no longer unique.

We do have many unique contributions to make, however, but we have so minimized them and so softened them that they are difficult to recognize. Suppose we take a closer look at a few of them.

Skill advancement. – Once upon a time, during the days of manual training and manual arts, this was the distinguishing feature of our work, but it has been dropped way down on the list of industrial-arts objectives. Skills have become something that we speak about very softly and almost apologetically. This is something that we can "sell." The revised bulletin, *Industrial Arts in Education,* which was prepared under the direction of Harold Silvius and his American Vocational Association editorial committee, lists three unique contributions, and each is related to *skills:* skills with tools and materials, industrial experiences, and skills with drawing.

Explorations of subject matter. – This is a highly respected objective of industrial arts. The application of this objective, however, has so often been so loose that it has often meant "wandering around," or even "floundering around," or just plain "taking in the sights." Genuine exploration means *directed study* of basic principles of construction and manufacturing to learn about the best or most appropriate uses of materials and processes. This is looking for, not looking at. This is teaching, not entertaining.

Planning. – Planning, in many instances, seems to have become more important than executing a plan. In

(*Continued on page* 24)

Saves time, temper, and helps you keep up with change

A Course of Study on File Cards

By Daniel J. Carnevale

LaSalle Junior-High School, Niagara Falls, New York

THE content of mechanical drawing as a subject is continually changing because of new developments as practiced in industry. To keep mechanical drawing fresh and lively and interesting to the student is difficult. Unless the student is interested in the subject, he is not going to learn it to the extent he is capable of learning it.

During the past I have revised my mechanical-drawing courses again and again to meet changes as they occurred. I am sure that many of you are plagued by this problem, too, and it is for that reason I am submitting a technique that I have found very helpful in revising my work and keeping my subject matter up-to-date.

I have organized, for my personal use, what I call a "Card Course of Study." Any changes can be easily made by removing out-of-date material and adding new matter on 4" x 5" index cards.

In the illustration above, you will note how the cards appear when they are filed under the correct classifications in the file container. Please note from the photograph that indexing tabs divide the courses as well as number the various lessons in each course. The accessibility of the information needed is apparent: The small index file can be placed in front of the teacher at all times, and 4" x 5" index cards can be handled with finger-tip ease.

Below is a reproduction of an actual card taken from our Mechanical Drawing I course. It shows the pertinent information necessary for the presentation of a lesson. Naturally the information for your beginning mechanical-drawing course would not be the same as mine.

The items on this card are in most instances selfexplanatory. "Plate 4," which appears after "Time," is an exception. Plate 4 means that this lesson (lesson 7 – note the tab in red) should be presented at the time the students are working on Plate 4 from their booklet of drawings that was drawn up and duplicated by me in accordance with New York State syllabus requirements. This booklet meets the needs of our school much more accurately than any textbooks available. The booklet, I should add, too, is continually being revised.

The lessons, to get back to the cards, are recorded briefly on the cards, and they are correlated and coordinated with the drawings in the booklets. They are numbered briefly in my plan book so they assist me in determining which group will be taught a particular lesson at a given time.

Additional information such as "Purpose," "Scope," "Time Requirements," "Method of Study," and a list of drawings for each course also precedes each course on the same type of indexing card.

I have found this method of indexing a course's content very valuable to me as a time saver, a temper saver, and a promising and adaptive teaching aid which suggests more uses as I continue to use it.

There appears to be no reason why it could not be adapted to other areas of industrial arts. This technique seems to be one of those devices worthy of consideration by teachers who are beset by the problems of the changes occurring in the content of industrial education. ★

7

Lesson 7

Title: Pencils

Objective: Impress upon pupil importance of selection of proper grade and point of pencil for each drawing.

Time: 1 Period (Plate 4)

Teaching Aids: H-2H-4H pencils, File card, models of conical, chisel, and wedge points.

Points To Stress:

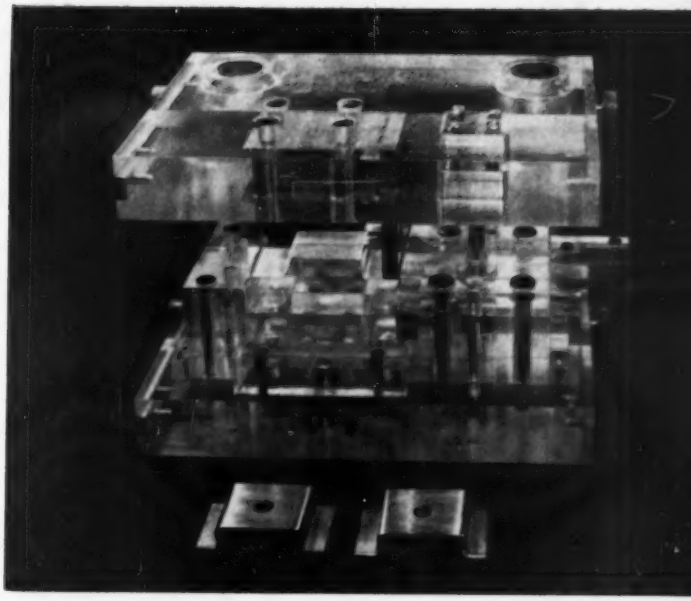
1. Importance of pencil
2. Make-up of pencil: Lead-Graphite-wax-(Wood) drawing pencil
3. Pass notes out and review
4. Grading lead: 9H-8H-7H-6H-5H-4H-3H-2H-H-B-2B-3B-4B-5B-6B-7B.
5. Shapes of lead: Conical, Chisel, Wedge

This teaching aid identifies and describes fundamental principles of dies as used in industry

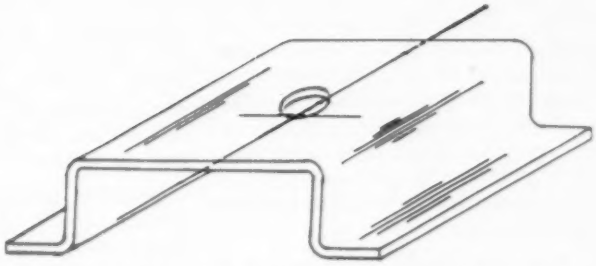
Students Can Now See How a Die Machine Pierces, Cuts Off, and Forms

By Carl W. Kienle

Cass Technical High School, Detroit, Michigan

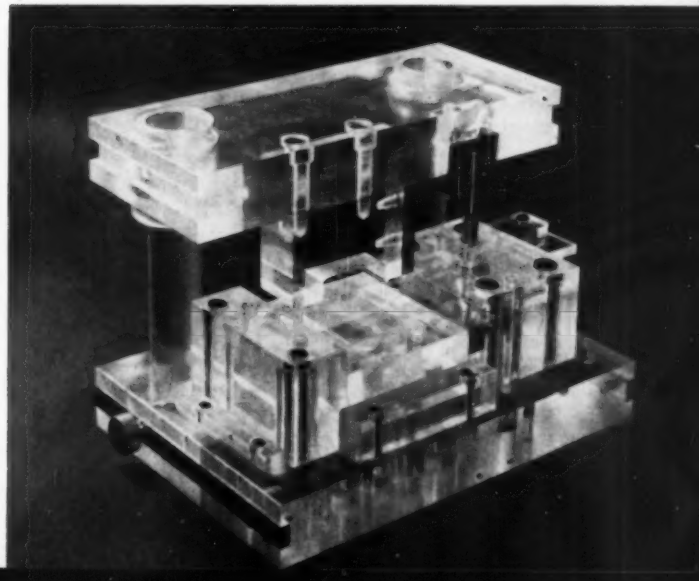


Above is a photograph of the complete teaching aid that demonstrates the piercing, cutting off, and forming process of materials.



Above is a drawing of the type of work piece turned out by this teaching aid. For detailed information and drawings about how to make one of these machines, please turn to the next two pages.

Below is a model of the teaching aid with the front half of the top removed for easier identification of the parts. (See drawing.)



MANY students who have advanced to die designing have little knowledge of the theory, construction, and operation of a die. Their main sources of information have been the instructor's lectures or what has been written in drafting texts. References, which include die design, often cover the broad field of die operations in many different industries. This results in the information not being directly applicable to course work.

The purpose of this teaching aid is to identify and describe the fundamental principles of dies used in industry so that students will have a basic understanding of die terminology and die operation. Furthermore, because this teaching aid is made from transparent plastic, students can actually see the die do its work.

This aid was designed to: (1) develop an understanding of the theory and operation of a die; (2) provide an opportunity for the student to familiarize himself with principles of die construction in a technological society; (3) foster appreciation of good workmanship and good design in industrial tools; (4) develop those reasoning powers needed to visualize intricate processes one cannot see; (5) promote wholesome work attitudes that lead to safe work practices and a systematic approach to complex design problems.

This lightweight scale model is made from clear plastic and tool steel so that it can be moved easily from one teaching situation to another. It is constructed according to standard practices in industry and incorporates three basic principles of die theory: pierce, cut-off, and form.

Its unique features are: (1) it functions like an industrial die; (2) a section view through the center of the die can be had by unscrewing four brass knobs and removing the front portion (Section A-A); (3) the teacher can involve pupils in its operation by using a thin strip of aluminum or heavy paper (to simulate stock) and have them feed and cycle the die through its basic operation.

The following procedure is recommended for those who want to make this aid:

Purchase the stock, as per stock list. (To reduce the cost of the plastic, and if you have your own sawing facilities, combine all of the different thicknesses into the least number of pieces. This will save you the cutting charges.) Machine, drill and counterbore, and grind all the plastic as indicated on the drawings. Machine, drill and counter-bore, and harden and grind details 9 and 10.

Purchase two pierce buttons (detail 12) and grind or rubber wheel in half so that each button will produce one true half. Purchase two ball lock retainers (detail 14) and repeat as per instructions for the pierce buttons. (*Caution*: Remove the ball and spring before cutting in half, and be sure that you cut through the ball seat of the retainer as shown in Section A-A.)

Glue the punch (detail 13) and the ball and spring from the retainer (detail 14) in the rear part of the retainer (Section A-A). Screw the tool steel, cut-off blades (detail 9) to the plastic (detail 8) and cut-off inserts (detail 10) to detail 15.

Lay out and mill the pockets in the punch and the die holders (details 1 and 2) for: (*a*) ½" x ½" pocket for keys (detail 3) in the die holder; (*b*) ½" deep x 1¾" square pocket for the punch retainer (detail 14) in the punch holder; (*c*) ¼" x ½" slots for the tie bars (detail 16) in the punch and die holder.

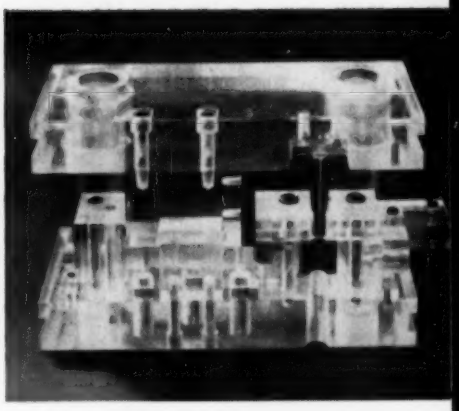
Drill and counter-bore the tie bars (detail 16) and insert them into details 1 and 2. Bore the punch and die holder (details 1 and 2) for the guide pins and bushing (details 21 and 22). (See Section B-B on the drawing.) Assemble, screw, and dowel all of the details on the die shoe. (See "Plan of Die.") Bore a 7/16" diameter hole into the stripper (detail 11) going through the button retainer (detail 15) and the die holder.

Remove the stripper (detail 11) and open the hole to .9375" in diameter by 15/16" deep in the button retainer (detail 15) for the die button (detail 12).

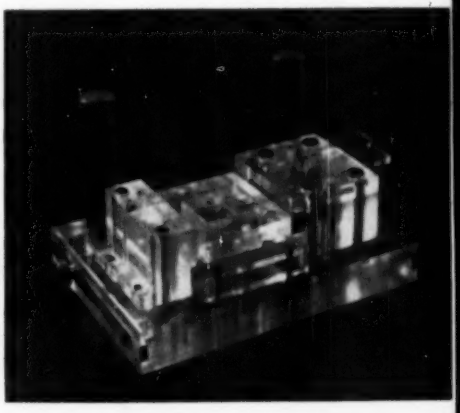
Install the die button (detail 12). Assemble, line up, and screw and dowel all of the details on the punch holder (see "Plan of Punch"). (*Note*: The punch holder must be placed on the guide pins of the die holder and made parallel for accurate lining up.)

Assemble the stripper (detail 11).

The die is now complete and ready to use in a demonstration. ★

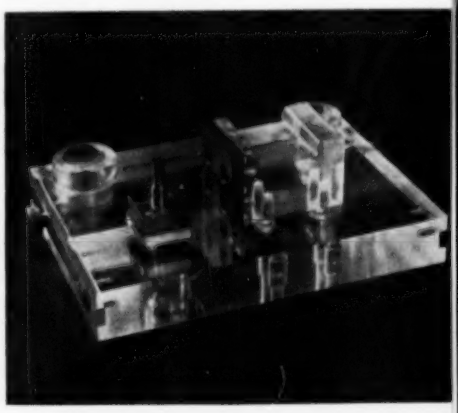


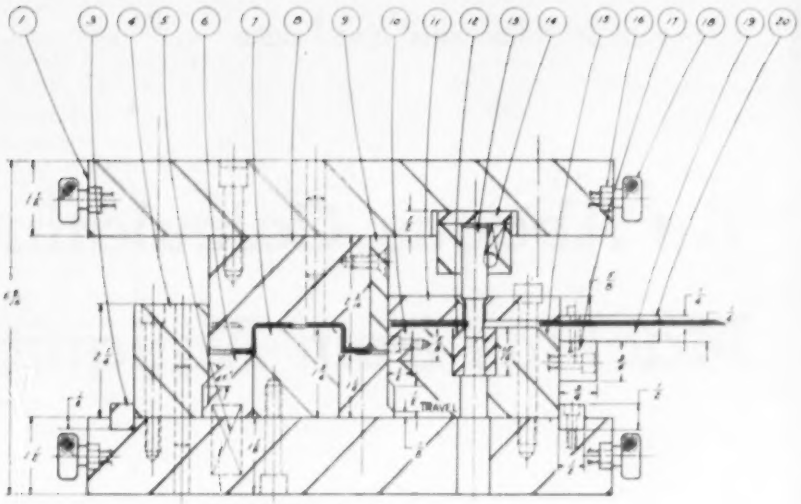
The teaching aid with all of the front half removed. Roughly, it corresponds to the drawing that is shown at top (left) at right.



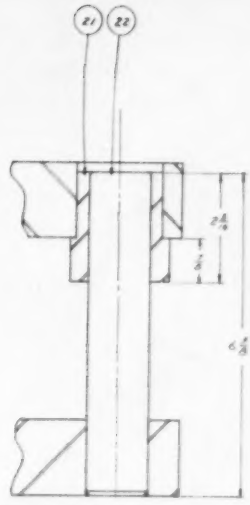
This is the bottom part of the teaching aid and it corresponds to the drawing that is directly opposite the photo on the next page.

This is the top of the teaching aid. As is its counterpart on page opposite, it should be noted that the picture here is inverted.

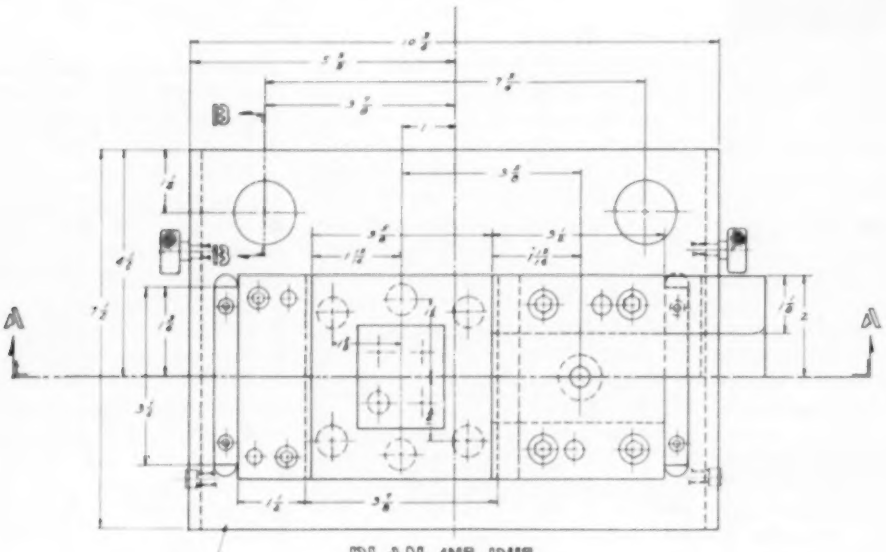




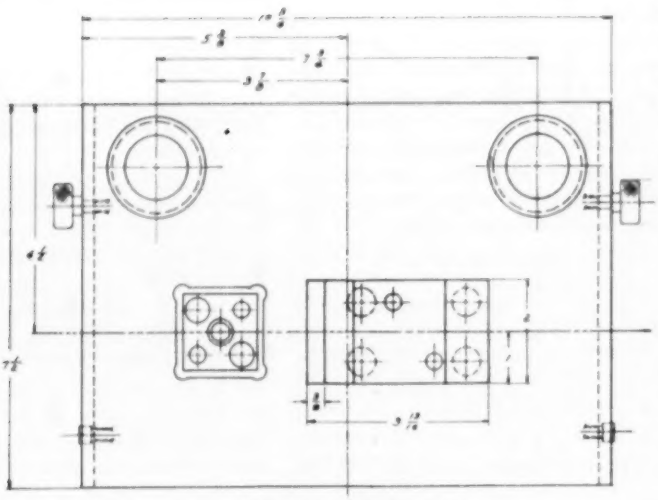
SECTION A-A



SECTION B-B



PLAN OF DIE



PLAN OF PUNCH
INVERTED

Bill of Materials

Part No.	No. of Pieces	Material	Size
22	2	Plastic	1¼" d x 6 7/16"
21	2	Plastic	2" d x 2¼"
20	1	Plastic	¼" x 1⅛" x 2"
19	1	Plastic	¼" x 2" x 2"
18	4	Brass	⅞" d x 1¼"
17	1	Plastic	¾" x ¾" x 2"
16	4	Gage steel	¼" x ½" x 7½"
15	2	Plastic	¾" x 2" x 3½"
14	2	St'd.	#23RB Ret. Set
13	1	St'd.	#104RB x 2½" x ⅜" Pt.
12	2	St'd.	#114RB x .377" I.D.
11	2	Plastic	¾" x 2" x 3½"
10	2	Gage steel	½" x ¾" x 2¼"
9	2	Gage steel	¾" x 1" x 2¼"
8	2	Plastic	1" x 2¼" x 3½"
7	2	Plastic	1" x 1¾" x 17⅞"
6	2	Plastic	1¼" x 2" x 4"
5	6	Spring	⅝" d x to suit
4	2	Plastic	1½" x 2" x 2⅜"
3	4	Plastic	½" x ½" x 1¾"
2	2	Plastic	1½" x 3⅛" x 10⅞"
1	2	Plastic	1½" x 4⅜" x 10⅞"

You could get "abacusitis" if you make

An Abacus: Calculating Machine from Antiquity

By Glenn H. Dickerson

Forsythe Junior-High School, Ann Arbor, Michigan

A SHORT time ago the special-education teacher in our building used the industrial-arts facilities to make a teaching aid for his class. It was this amazing, nonmagnetic, nonelectrical, nonhydraulic, and non-automated "adding machine" called an *abacus*. He intended to use this teaching aid to give his students a fresh approach to arithmetic.

He reasoned that numbers, addition, and subtraction would be easier and more fun for his students if they weren't dealing in abstract symbols, as in pencil arithmetic, but instead used this interest-arousing, interest-holding counting machine. More recently, a girl in my eighth-grade general-shop class became interested in the abacus and wanted to build one. Both she and our special-education teacher made the Chinese abacus, which has seven beads on each vertical bar, two beads above the horizontal divider, each of these having a value of 5, and five beads below the horizontal divider, each of these having a value of 1. The abacus I shall describe here is the Japanese version. Its top beads are worth 5, and its lower beads are worth 1.

At any rate, I contracted the disease, "abacusitis," and once you become fascinated by this primitive adding machine, you just have to involve all of your acquaintances with your enthusiasm. Although you will feel like you have discovered something new, you won't be the first. These instruments date back to 600 B.C. They are still used in the Orient by store clerks and banks, even though these establishments have modern calculating machines, because "the abacus is much faster and is never wrong." And, this reminds me of a story.

When I was a youngster, I heard my friend's father say to him, "You can't have a bike until you learn how to ride one." I thought that was a rather ridiculous thing to say, because how could he learn to ride a bike if he didn't have one? He couldn't learn on mine because I didn't have one either. Which brings up the subject of the abacus.

How are you going to learn how to use the abacus if you don't have one. Chances are you can't borrow your neighbor's because he doesn't have one either. So, you'll just have to make an abacus, and I can tell you how. Then the sequence of events will be proper. First, acquire an abacus. Then learn how to use it. Don't skip the middle paragraphs of this article because the how-to-use-the-abacus information is there. In fact, if you stick around until the very end, I might even tell you just what an abacus is.

The actual construction of the abacus is fairly simple. You can use the plan worked out in our shop, or alter it to suit your needs.

Bill of Material

Horizontal frame members	2 pcs.	½"x1¼"x10½"
Vertical frame members	2 pcs.	½"x1¼"x 4½"
Horizontal divider	1 pc.	3/16"x1¼"x 9⅞"
Vertical bars	6 pcs.	3/16"x5" long steel rod
Beads	30 pcs.	1¼" dia. x ⅜" thick

The steel rods are spaced 1½" on center and ⅜" down from the top edge of the frame. If you desire an abacus with more range, simply space out more columns 1½" on center.

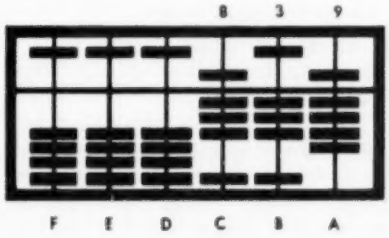
Making the beads presents a bit of a challenge because several different methods can be used. We blanked them out of flat stock on the drill press with a hole saw which provided a ¼" center hole with the same operation. The frame was made of black willow and the beads out of maple to give the final product a natural color contrast. We made an arbor out of a lathe center. The radius of the beads was filed and sanded, and they were even given a quick French polish on the wood lathe. A student can turn out his 30 beads in two or three class periods. A ¼" Jacobs chuck, fitted with a ¼" bolt and threaded on the end of the buffer arbor, worked very well, too. The shank of the headless bolt was locked in the chuck, and the bead blank was secured on the bolt between two nuts, one of which backed tight to the ends of the threads of the bolt. But I'm sure that other methods can be used with equal success.

This project has high student appeal because it is a useful and fascinating article. It is not something merely to take home and place on a shelf. It is a workable, functional instrument that can help the student in some other subject. He will certainly become more interested in math. He may even dig into history to find out more about the abacus, and, in so doing, a little geography may rub off on him. When we can

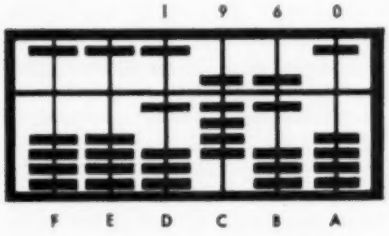
use industrial arts to promote a skill or interest in another school subject we are raising our level of usefulness to the over-all program.

When the abacus is in use it is laid flat on a table with all of its beads against the outside members of the frame. When adding, the beads are moved to the center horizontal divider, and in subtraction the beads are moved away from the center horizontal bar, after setting up the initial number. Numbers are set up from the right-hand end of the abacus. A two-digit number would use the first two right-hand vertical bars, a five-digit number would use the first five right-hand vertical bars; and so on. To set up the number 839, for example, the following manipulations are necessary:

1. On vertical bar C, move one top bead down to the horizontal divider (top bead down is a plus 5) and move up three lower beads. We now have 8 on the C bar.
2. On vertical bar B move three beads up.
3. On vertical bar A slide down one bead (value of 5) and move up four lower beads (value of one each): 5 plus 4 are 9 on the A column.

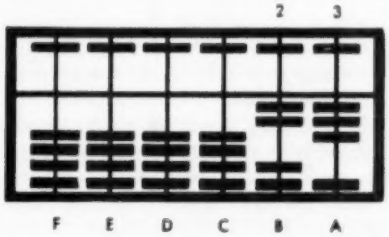


This setup reads 1960:

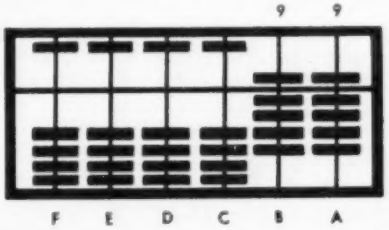


Now let's do a simple problem in addition. Add 23 and 76.

1. Set up 23 by moving up two beads on bar B and three beads on bar A.



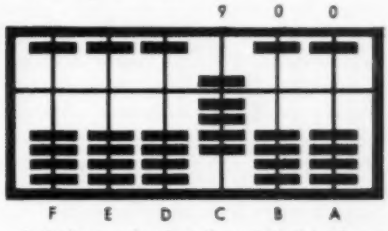
2. To add the 76, 7 must be added to column B and 6 to column A. Move up two more lower beads and slide down the top bead in column B, making that column read 9. To add 6 to column A, move down the top bead (value of 5) and move up one lower bead. Five and 1 are 6 added to the A column which now reads 9. The abacus is correct as it reads 99.



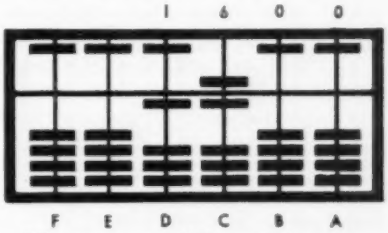
The first column on the right is the unit column; the second column from the right is the 10 column; the third column is the 100 column; the fourth column is the 1,000 column; the fifth column from the right is the 10,000 column; the sixth column from the right is the 100,000 column; and so on. However, any lower bead in the column to the immediate left of the column you are working on is considered a 10 in relation to the column you are working on. An upper bead is 50 under the same conditions. This little "gimmick" can be used to "borrow" and "carry" just as we do in pencil arithmetic. It works like this: If all of the beads were used up in the C column and we had to add 7 to it, we would raise one lower bead (value of 10) in the D column. That is, we would add 10 to the D column, and lower three beads (subtract 3) in the C column. A plus 10 and a minus 3 is a plus 7. So, adding 10 to column D and subtracting 3 from column C is the same as adding 7 to column C, which is what we wanted to do but couldn't do directly because all of the beads in the column were used up.

To try this manipulation add 700 to 900.

1. Set up the 900.



2. Raise one bead (value of 10) in column D, and drop three beads in column C.

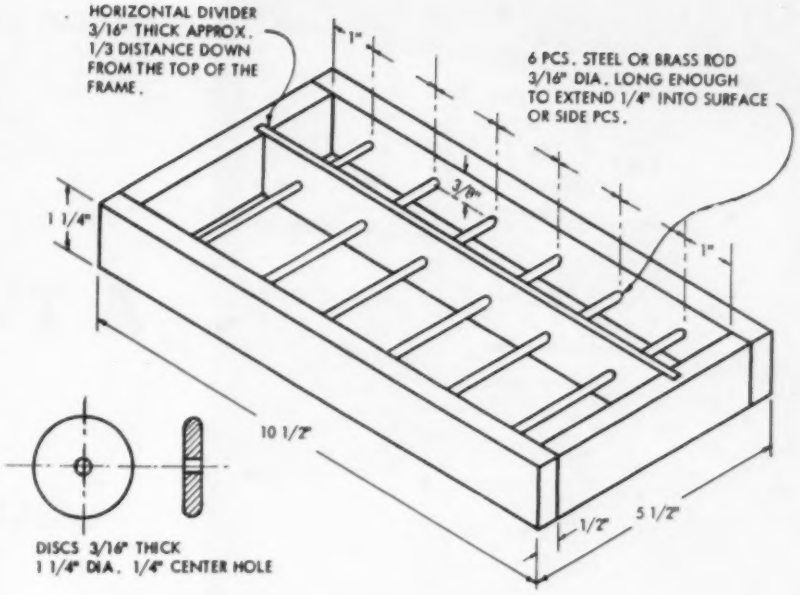


The answer is 1600, and the abacus is correct, of course.

Are you bold enough by now to try a subtraction problem? OK, but let's toss in a few "complications." Subtract 569 from 632.

1. Set up 632.

(*Continued on page 19*)


HORIZONTAL DIVIDER 3/16" THICK APPROX. 1/3 DISTANCE DOWN FROM THE TOP OF THE FRAME.
6 PCS. STEEL OR BRASS ROD 3/16" DIA. LONG ENOUGH TO EXTEND 1/4" INTO SURFACE OR SIDE PCS.
1"
3/8"
1 1/4"
1"
10 1/2"
1/2"
5 1/2"
DISCS 3/16" THICK
1 1/4" DIA. 1/4" CENTER HOLE

FOR THE CHINESE ABACUS, ARRANGE 2 DISCS ABOVE DIVIDER AND 5 DISCS BELOW ON EACH VERTICAL ROD. THE JAPANESE MODEL WILL HAVE 1 DISC ABOVE AND 4 DISCS BELOW. EACH TOP DISC HAS A VALUE OF 5. EACH LOWER DISC HAS A VALUE OF 1.

Eide Alawan adjusting the demonstrator television which he built as a student at Cass Technical High School. The inspiration for this winner came from a back issue of School Shop kept in the shop library.

A Ford IAA winner

A TV Teaching and Learning Aid

By M. Lawrence Applebaum

Cass Technical High School, Detroit, Michigan

A PROJECT is an important adjunct to learning. The student, when constructing a project under proper supervision, can certainly "learn by doing" and put into practice the many things learned in the lecture room. For this reason I retain a number of magazines in the "Laboratory Reference Library." Among these magazines is SCHOOL SHOP. When one of my students, Eide Alawan, could not decide on a project, he studied the various magazines in the magazine section of the Laboratory Reference Library and found an article titled "Demonstrator Simplifies TV Learning" by Norval F. Fell, in the December 1952 issue of SCHOOL SHOP much to his liking. Eide then proceeded to plan, design, and construct a similar television demonstrator.

Because of the economics of time and money, the circuit decided on was an intercarrier series-string circuit. The circuit is illustrated in block diagram form (Fig. 1).

Because of the realization that one of the major obstacles in the teaching and understanding of electronics is the lack of mechanical movement, the circuit was laid out in a manner which would be expedient to both teacher and student. The TV demonstrator was constructed on a plywood panel approximately 4' x 6'.

For purposes of clarification, the panel was divided into sections. Each section represents a section of the television receiver, and each section is divided from an adjoining section by aluminum stripping. These sections are:

(1.) The front end; (2.) the low-voltage power supply and heater connections; (3.) video I-F, video detector, and video amp. and sync separator; (4.) sound I-F, ratio detector, and A-F amplifier; (5.) vertical deflection; (6.) horizontal deflection and high voltage; (7.) pix tube (CRT) and speaker.

This division of the circuit makes possible a closer study of the theory of operation as well as of the function of each of the components for each section, and of the relationship of the section to the complete receiver. The rectifier, a semiconductor, each resistor, each capacitor, with the exception of electrolytics, and each RF choke plugs into the circuit. Because of the great losses which would result in the spreading out of the circuit, the front end was left intact as a unit. Type FT-241-A crystal holders were purchased and disassembled and the components were soldered to the "inside" pin connections as illustrated (Fig. 2).

This type of teaching aid has almost unlimited possibilities for the dissemination of information regarding the various circuits found in a television receiver. For example, a circuit may be caused to malfunction by using improper values or faulty resistors and capacitors (these have been previously prepared by being mounted on extra crystal holder bases), plugged into the circuit in place of the correct component.

Other features showing the versatility of this type of demonstrator are the many strategically located banana jacks in each of the various circuits. This makes possible both voltage and oscilloscope checks throughout the entire circuit. In an I-F stage, for example, it is possible to take measurements of signal input, signal output, plate voltage, screen voltage, bias voltage, A-G-C voltage, etc.

Here are listed some of the many classroom demonstrations that can be done by this TV demonstrator:

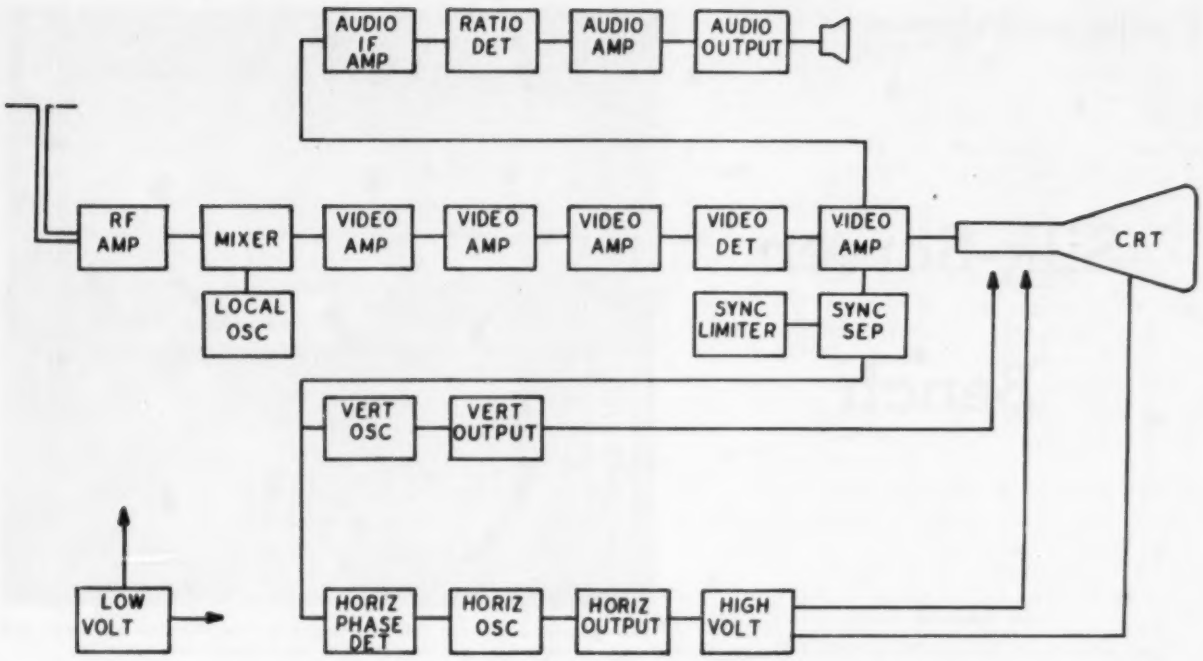


FIGURE I. BLOCK DIAGRAM OF TV DEMONSTRATOR

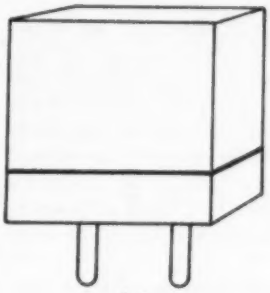
Front-end alignment and response curve; pix I-F alignment and response curve; sound alignment and response curve; ion-trap adjustment; and focusing-coil adjustment.

Horizontal oscillator and hold adjustment; raster centering; keystoning; raster not high enough; horizontal line, no raster; rolling picture, horizontal and vertical; and poor vertical linearity.

Poor horizontal linearity; improper focus; sound in picture; one-half of raster darker than the other half; stage-by-stage voltage measurements; stage gain; ratio detector alignment and response curve; composite picture signal, one field; and composite picture, one horizontal line.

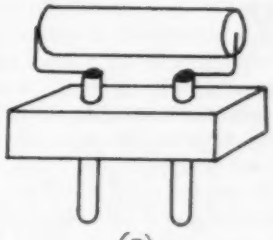
Horizontal synchronization; vertical synchronization; waveform analysis, synchronization pulses, blanking pulses, horizontal oscillator, vertical oscillator, A-G-C, and saw-tooth.

Saw-tooth waveforms and linearity; hum in the picture channel; and effect of hum on synchronization.



(A)

FT-241-A CRYSTAL HOLDER



(B)

CRYSTAL HOLDER DISASSEMBLED SHOWING MOUNTED COMPONENT

FIGURE 2.

With this type of visual aid it is possible for the student to more closely associate a given circuit to the entire circuit and the entire circuit to the circuits now in use. The student also is better able to correlate the functions of the various controls and their associated circuitry, and there is more meaning to the control than just the rotation of a knob or shaft. By deliberately introducing defects into this demonstrator, a practical approach to servicing by the student compels him to make use of proper servicing and test equipment to locate and correct such defects. To facilitate servicing procedures, each component is mounted next to its schematic symbol and can be quickly removed by simply unplugging it. The generous quantity and strategic placement of test points will effect a considerable saving in time for instrumentation.

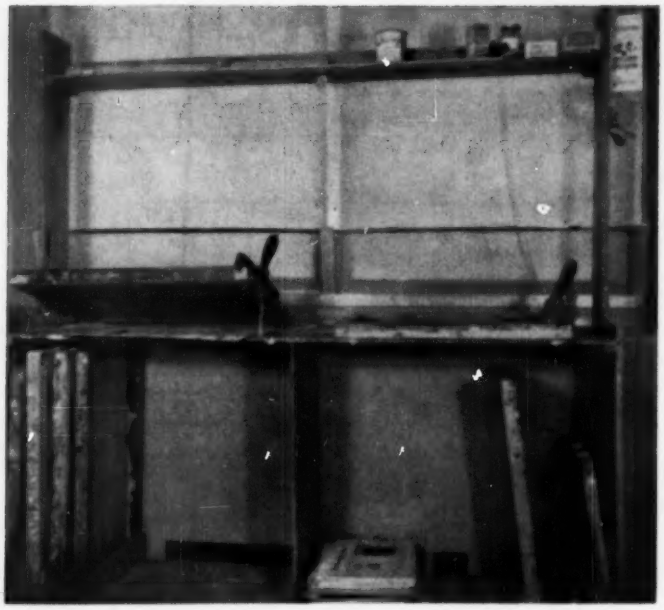
To say the least, I am much indebted to Eide for the many hours of his time used in planning, designing, and constructing such a fine and worthwhile project. He entered this TV demonstrator in the Ford Industrial Arts Award contest and earned a second prize. ★

It serves many functions

Silk-Screen Bench

By Samuel Garry

James M. Kieran Junior-High School, Bronx, New York



This compact silk-screen unit is arranged so that materials are handy and operations do not interfere with other graphic-arts operations.

YOU can successfully introduce a silk-screen unit into your shop program with the aid of this professional screening bench. Your biggest problems—storing large, bulky screens and improvising work space among the type frames and binding tables—are immediately taken care of. The screening unit will store eight or more frames, from the smallest sizes to a size that will screen a 16" x 20" poster.

There is a simple arrangement for attaching the frame as well as sufficient work area for two screens to be operated at one time. Noninflammable materials such as tape, extra spring legs, squeegees, and silk can be stored on the top shelf. Additional shelves can be used to hold inks and cleaning solutions during the screening operations.

I have designed the unit to fit the measurements of my shop. The unit fits snugly in front of two windows. The table is exactly the height of the radiator cover. I extended the rear of the table so that it will fit over the radiator cover to increase the rigidity of the unit and I placed a metal cabinet nearby for storing inflammable materials. The unit does not interfere with any of the other graphic-arts activities, such as bookbinding and typesetting. All three go on simultaneously.

I use the screening unit to add a bit of color and splash to my graphic-arts course of study. In addition, the many posters we have produced have helped to sell innumerable school activities, such as operettas, exhibits, concerts, the Open School Weeks, to the community.

Many of the ideas and designs originate and are developed outside the graphic-arts shop. When an event is planned, the faculty or student committee greets me with: "May we have a poster or two?" I can hardly refuse so polite a request since I have the unit for that purpose. I submit the request to several classes which are studying art with one of my cooperating art teachers. She in turn devotes several lessons to designing appropriate posters for screening. When the best one or two designs are chosen by the committee, several graphic-arts students will proceed to reproduce them in quantity. We have stencil cutters, adherers, frisket makers, and squeegee men in several classes. Cooperatively we might turn out 200 posters for a major school project, such as the "Mikado." Individual screening jobs by the students range from greeting cards, informals, and place mats to large signs for a community affair. In these jobs, each student does all of the operations himself. He designs, cuts, and screens the entire job. Although, when appropriate, two boys will work on one job together.

Water-base inks help to simplify the clean-up of the screen after the printing. The screens and the squeegees can be just rinsed in the sink. Oil-base inks are not difficult to clean with enough rags and benzine about. A technique we have learned that might help some neophyte clean his screen follows: (*a*) remove frisket; (*b*) place screen on old newspaper; (*c*) pour liberal quantity of benzine all over screen; (*d*) squeegee the benzine into one corner, wipe clean with rags. You'll find most of the ink gone with the first wipe. A short recleaning with benzine-soaked rags will thoroughly clean the screen.

Build your screening unit to meet the needs and specifications of your own shop. Try not to skimp on size because the larger the unit, the easier it will be to maneuver the frames and squeegees. The unit shown (Fig. 1 drawing) is 6′ x 6′. Place the unit in a well lighted and well ventilated part

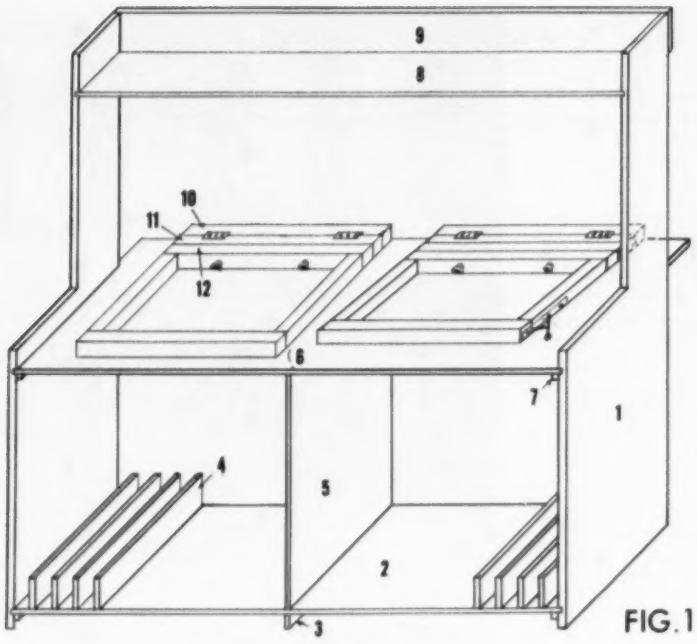


FIG. 1

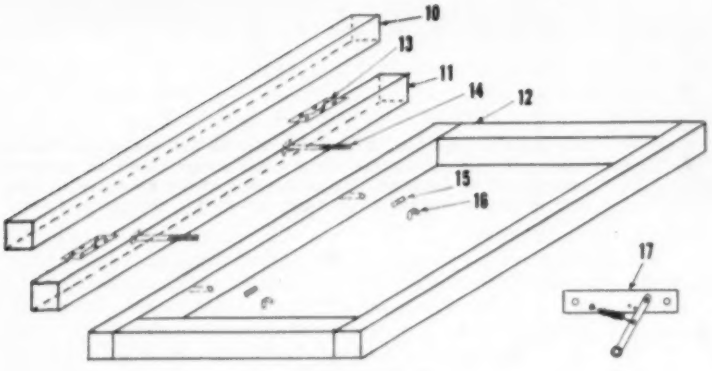


FIG. 2

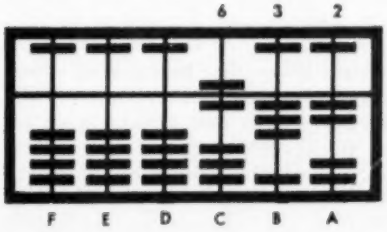
of the room. A school display of the first posters and cards made by your students will result in getting many additional requests for the use of the unit. The short time it takes to build this unit will be amply repaid in the additional student interest it will generate.

You will need two ¾" and three ½" plywood panels 3' x 6' for the frame and shelves of the unit. Twenty-four feet of 1 ¾" square stock will make up the two frames, 18" x 26½", and the supporting pieces. Parts #1, #2, and #6 (Fig. 1) are assembled with dado-block joints. I use ¼"-20 machine screws and nuts to attach the blocks.

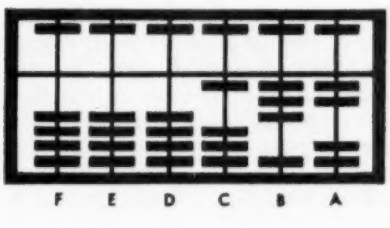
Part #10 (Fig. 2) is attached from under the table with wood screws. Drill ¼" holes in part #11 and counter-bore so that the head of the bolt is below the surface and #10 and #11 can be attached with the 3" butt hinges. Drill ¼" holes in the edge of the frame (#12) that is to be attached to #11.

The washers and wing nuts hold the frame during the printing operation. All your frames should have the same holes so that they may be used on either side of the unit. Each frame can be attached by slipping it on the carriage bolts and attaching the washer and wing nut. Parts #10 and #11 are permanently attached to the unit. I used a commercial spring leg (#17) that can be easily moved from one frame to another to raise and lower the frame during the printing operation. ★

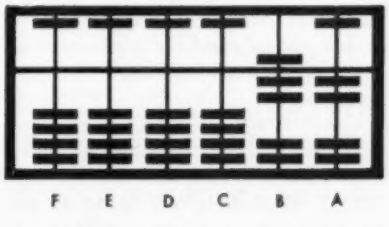
Abacus . . . . . *from page 15*



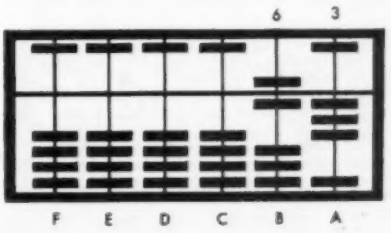
2. Take five from six in the C column by raising the top bead.



3. Take 6 from the B column. This cannot be done directly, so we subtract 10 from the C column by lowering one bead and add 4 to the B column by adding 5 (lower one top bead) and subtracting 1 (drop 1 lower bead). We, then, have combined a minus 10 in the C column and a plus 4 in the B column which is the same as a minus 6 in the B column.



4. Finally, take 9 from the A column. Do this by lowering one bead (a minus 10) in the B column and raising one bead (plus 1) in the A column: minus 10 plus 1 is a minus 9, leaving 3 in column A.



The abacus is correct again as it reads 63.

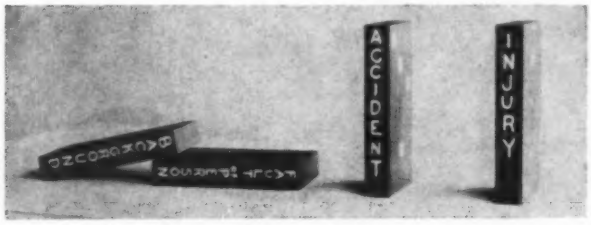
Abacus Arithmetic by Welton J. Crook, published by Pacific Books of Palo Alto, Calif., is an excellent manual on the abacus. This book explains multiplication and division as well as addition and subtraction. Also, there is a very good article on the abacus in the November 1959 issue of *Pageant* magazine. ★

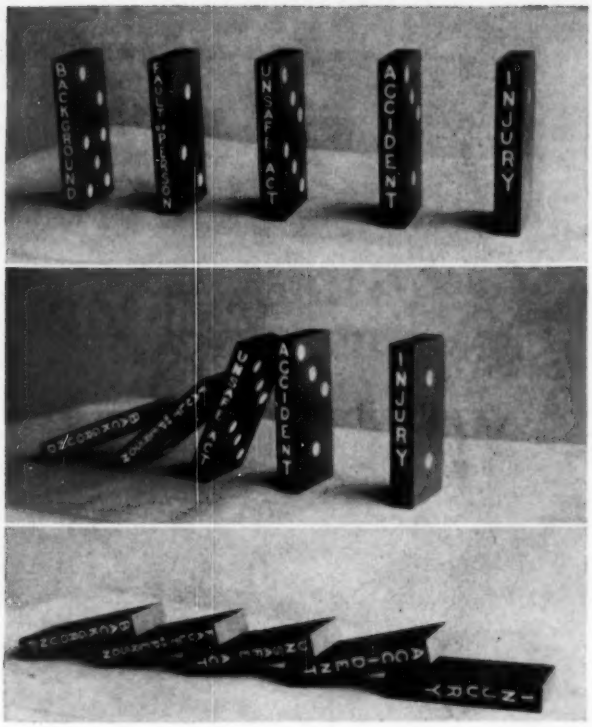
A method for dramatizing

A Safety Lesson

By Clarence W. Lubbe

Levittown Township Junior-Senior High School,
Levittown, New Jersey





The series of photographs above shows the five phrases on dominoes used to dramatize the chain reaction that results in someone getting hurt in the shop. The photograph at left shows what happens when an "unsafe act" is not committed: Nobody gets hurt.

A DYNAMIC safety lesson can be presented by using five phrases: background, fault of person, unsafe act or condition, accident, injury.

For props, construct five dominoes, each 2" x 6" x 12". After the dominoes have been painted black and the dots added, paint one of the five phrases above on each of the edges as shown in the illustration.

The approach to the lesson is that any accident, and the injury that results, is the product of *all* five phrases.

As each phrase is discussed, the domino with the appropriate phrase is placed on a table in front of the class. Each succeeding domino, after its phrase has been discussed, is placed 8" away from the preceding domino. Let's now consider each word or phrase.

Background.—Every student is the product of his environment. A student who is neat as a child, for example, will grow up with good habits that will carry over into his shop work. If a youngster is accustomed to leaving his toys lying around his room, on the other hand, it is likely that he will carry over those habits into his shop work which will result in his doing sloppy and careless work.

Fault of person.—A person who has developed careless attitudes, poor health habits, and is inattentive is more accident prone than an alert person.

Unsafe act or condition.—A person can have a poor background, be a faulty person, and still be accident free if he never commits an unsafe act or creates an unsafe condition.

Accident. — The accident occurs only after the background, the faulty person, and the unsafe act or condition get together.

Injury.—The injury is the result of the chain reaction of the first four phrases.

To emphasize this chain reaction, the dominoes are then placed upright and arranged in the sequence illustrated. When the "background" domino is knocked over, it sets off the chain reaction that knocks down all of the dominoes. But if the "unsafe act or condition" domino is removed, the first two dominoes will fall down without the others being pushed to knock over the "injury" domino.

In other words, all five of these phrases must exist for an injury to result. One leads to the next, and so on. Students should, then, become aware of the conditions or acts that can cause accidents in the shop. Then, too, they can take corrective steps to prevent the acts and correct the conditions. ★

Some Comments about a "Noteworthy Proposal"

Editor's Note: **The box below contains a major portion of a communication that appeared in the February issue of SCHOOL SHOP. Appearing with it was an invitation for SCHOOL SHOP readers to use the magazine's editorial columns as an open forum to express their feelings and opinions regarding the proposal made by Messrs. London and Karnes. Below, and continuing on the next page, are some of the letters received to date by SCHOOL SHOP concerning the problem discussed here.**

To School Shop readers:

We have always felt it unwise to have two national associations representing industrial arts in this country. It seems to us that people in this field are tired of paying dues to both organizations, of choosing between one or the other, and of tolerating the dualism resulting from this set-up. We are reasonably certain, also, that the exhibitors who exhibit their wares at the national conventions would be happy if they could have just one exhibit a year when they could show and demonstrate their equipment and materials to industrial-arts personnel. . . .

Therefore, we suggest that the time is ripe for a committee representing the American Industrial Arts Association and the Industrial Arts Division of the American Vocational Association to get together to discuss plans for amalgamating these two organizations into one. . . . If they were amalgamated into one strong organization and could thus present a united front, we think progress could be made in enrolling many more teachers, and in promoting and improving instruction in this phase of public education.

Since the AIAA is an affiliate of the NEA and the Industrial Arts Division of the AVA is not so affiliated, this will obviously cause some difficulty. . . . In any event these problems deserve exploration by a group of broad-minded leaders in the field. . . .

Perhaps a first step in the unification of these groups would be to hold a joint convention. . . .

(Signed:)

H. H. London,
Professor of Industrial Education,
University of Missouri.

M. Ray Karnes,
Professor of Higher Education,
University of Illinois.

Dear Sir,

I am pleased with the opportunity to react to the suggestions of Messrs. London and Karnes as presented in their letter to you. They have presented a good case for an excellent cause. I would endorse the effort and I would also encourage others to do the same.

They have suggested that the first step in the unification of the American Industrial Arts Association and the Industrial Arts Division of the American Vocational Association would be to hold a joint convention. This is an appropriate suggestion. If this is to be the first step, it might be delayed several years due to the future convention committments that both organizations have already made.

Discussions of the unification topic, by the executive committee of the AVA last April in Pittsburgh and again during the convention in Los Angeles (December 1960), resulted in the suggestion that the Industrial Arts Policy and Planning Committee explore the possibility of meeting with a similar core group from the American Industrial Arts Association. To this date, I do not know of any action resulting from this suggestion. You will recall that this topic was discussed briefly at the Mississippi Valley Industrial Arts Conference.

This seems to be an appropriate time for action. You may be aware that the AVA is now providing much more leadership and services to the Industrial Arts Division than was true years ago when the AIAA was organized.

When the subject is raised about the whole AVA affiliating with the National Education Association, consideration must be given to the several divisions in addition to the Industrial Arts Division.

As in any partnership, each side would have to give up some things. Surely, each side has men of stature who could negotiate.

E. M. Claude
Past-President of the American Vocational Association,
Chief, Trade and Industrial Education,
State Board of Vocational Education,
Springfield, Ill.

Dear Sir,

Should the two national industrial-arts organizations (the American Industrial Arts Association and the Industrial Arts Division of the American Vocational Association) be combined? The answer is unequivocally "no" for the following reasons:

1. Our country has succeeded in large part because of competitive individual enterprises. Should one believe that education is different from business and industry? Both organizations are making a contribution. Should anyone be disturbed over the competitive idea? Let it be known that there is much cooperation between both groups.

2. Every professional group seeks and must have identity. Most areas in education, mathematics for instance, have identity with the National Education Association as a department. Unless industrial arts, by name, is identified on a national basis we lose immeasurably.

3. Each of the two organizations is performing a particular function. It so happens that industrial arts finds itself in the anomalous position of being both general education and vocational education. By philosophy, it is general education. In reality, it is vocational education in many systems. Obviously one national association champions the cause of one philosophical phase while the second functions in like manner for the other.

4. Many leaders in our field belong to both associations. Anyone, teacher-educator, supervisor, or administrator who has responsibility to both industrial arts and trade and industrial education should surely belong to the American Vocational Association. Anyone whose responsibility rests solely in the realm of industrial arts should surely belong to the American Industrial Arts Association. Both individuals have in the past belonged to both associations so that they might be well informed, so that good fellowship can exist between the industrial and the trade and industrial professional people.

5. It has been said that we have too many associations, too many dues, and too many conventions. Any association which succeeds is making a contribution and has a right to continue. Dues paid by an industrial educator, assuming he belongs to all available associations, represents but a small percentage of the dues paid by other professions. Conventions are always a source of inspiration. It is unfortunate that more of our group cannot attend more conventions. Let us remember that convention attendance is not mandatory, and let us also remember that two national conventions located in cities far removed from one another enable our men to attend the association closest, thereby effecting financial savings.

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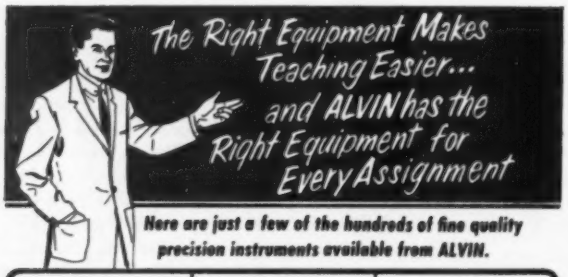

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Should the two associations be united, let us face some of the problems before the decision is made. What will determine which of the two groups will absorb the other, or will a new association be formed? With what national association will this new group be affiliated?

The AIAA has at this time approximately six times as many members as the Industrial Arts Division of the AVA. Secondly, the AIAA is about to embark on a new and challenging program with a full-time executive-secretary. This program will enable the AIAA to provide national leadership in a measure greater than ever before. Will these facts determine which way the merger will proceed?

Industrial-arts education is facing a crisis. Intercontinental ballistic missiles have shifted emphasis both in secondary and higher education. If industrial arts is to live and prosper, it will only as a general-education study of industry, not as quasi vocational education or math or science. To achieve this goal, the profession must seek the backing of prestige associations such as the National Education Association and at the same time maintain its identity as *industrial arts*.

Kermit A. Seefeld,
Department of Industrial Arts,
University of California, Santa Barbara,
Goleta, Calif.

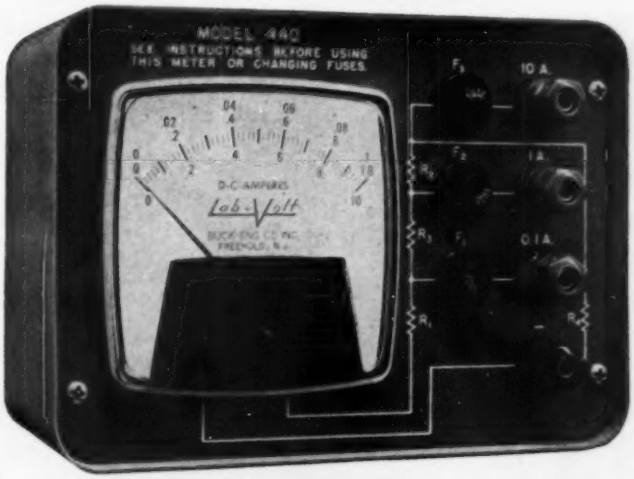
Dear Sir,

I appreciate your invitation to have me react to the suggestions of Messrs. London and Karnes for "amalgamating" the American Industrial Arts Association and the Industrial Arts Division of the American Vocational Association in one organization. I want to say at the outset that I favor one strong national organization for those engaged in the industrial-arts profession. The simplest and most logical solution to the problem raised would be to have the approximately 1,000 industrial-arts members of the AVA join forces with the AIAA which is now approaching 8,000 members. A great many of them are already members of the AIAA.

There, no doubt, is some truth to the statement that "people in the field are tired of paying dues to both organizations, of choosing between one or the other, and of tolerating the dualism resulting from the set-up." In my judgment, these may be some of the reasons why during the past 12 years, during which time I have been closely associated with both organizations, the industrial-arts membership in the AVA has been declining, while the membership in the AIAA has increased each year.

But the chief reason for the steady growth of the AIAA, in my opinion, is the awareness of the industrial-arts teacher that the AIAA is the only national association representing industrial arts, as the National Science Teachers Association, for example, represents the science teachers. The AIAA came into existence because of the recognized need for a national organization designed to promote and improve industrial arts in general education, while the AVA has as its primary function the promotion and improvement of vocational education. Since industrial arts is not vocational education, it is now and will always be the stepchild of the AVA. This is the reason why it would be difficult to sell the industrial-arts people on the suggestion that the AIAA become a division of the AVA.

The AIAA is on the move! Kenneth E. Dawson assumed his duties on January 3, 1961, as our first full-time executive secretary with an office in the NEA Building in Washington, D.C. We are in a position to provide greater service to the profession than ever before. We are getting more support from the classroom teachers than ever before. While I personally would have no objection to a committee representing both groups to study the problem, I do not see that much could be gained by such a study. Those supervisors and teacher educators involved in both industrial arts and vocational education will, I believe, always support an association affiliated with the AVA, while the majority of those con-



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cerned solely with industrial arts will support the AIAA, one of the 30 departments of the NEA.

The AIAA extends an invitation to all the industrial-arts members of the AVA to join its ranks and help make it the strong professional organization it is destined to become.

Ivan Hostetler,
President, American Industrial Arts Association,
Head, Department of Industrial Arts, North Carolina State College,
Raleigh, N.C.

***Editor's Note:* Watch future issues of SCHOOL SHOP magazine for additional thoughtful comments on the important issue discussed in the preceding correspondence to the Editor.**

"You wouldn't consider leaving your project here for a couple of months, would you?"

NEW AIAA SECRETARY

KENNETH E. Dawson of West Hyattsville, Md., has been appointed the first full-time executive secretary of the American Industrial Arts Association. Mr. Dawson assumed his duties January 3, 1961. His office is in the NEA Building, 1201 16th St., N.W., Washington 6, D.C.

Mr. Dawson

The appointment was made by AIAA President Ivan Hostetler with the approval of the executive committee.

Mr. Dawson was recommended by a special committee appointed to seek a man for this task. A native of Chatham, Va., he received the B.S. degree from Virginia Polytechnic Institute; the M. Ed. degree from the University of Virginia; and he has completed all of the course requirements toward the doctorate from the University of Maryland.

Mr. Dawson has taught in public schools in Virginia, served on the staff of Virginia Polytechnic Institute, and was a graduate assistant in industrial arts at the University of Maryland. ★

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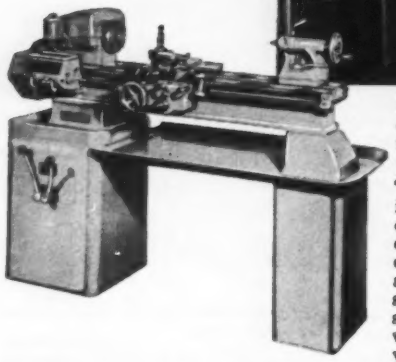

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Rediscovering . . . *from page 9* some shops, it has become acceptable for a boy to end up with a table which is inches short of his plan because it is "planning" that is being taught, not accurate execution of a plan. This raises some questions: Why cannot both planning and execution be taught? Why isn't accuracy important if industrial arts is a study of industry? In industry, as you well know, planning is done by few, but accurate execution of the plan is the responsibility of all and is done by all persons concerned.

Having students reach a decision.—Decision reaching, whether it involves what to make or how to make it, is often considered more important than having the teacher explain when, why, or how to do it. Allowing students to make their own decisions has often resulted in students trying operations that even the teacher has not experienced. What is so "industrial" or so "arts" about this? Is reaching a decision unique? It is little wonder, then, that students naturally assume that industrial arts is just plain "making things."

Methods.—Methods, so long as they are new, have come to be regarded more highly than course content or a

study guide that outlines what should be taught. Pupils are often expected to tell their teachers what they want to do. The direction of study is then supposed to develop as the semester advances. What usually develops, however, are discipline problems. Surely we have facts and skills important enough to spell out in sequential order. If we must feel compulsive about imitating the academics, why can't we then follow their technique?

Repeating and practicing facts and skills can be cut-and-dried, deadly instruction. But facts and skills, related to each other in such a way that students come to understand the concepts and generalizations necessary to master problem solving along with them, is something else. Individuals never learn anything effectively unless they have practice. Furthermore, practice will not lead anywhere until someone helps them to understand why what they are practicing is right or wrong. This means: (1) the teacher must know what is being done so that he can advise; (2) students must accumulate workable facts and useful knowledge to help them reach the right decision.

It can be argued, naturally, that planning for the sake of planning or that exploring for entertainment is being unique. But, free exploration, or playing around in subject matter, is one thing; demonstrating skills and directing knowledge so that students will discover and experience selected principles are something else.

For example: What about the learning that takes place when a student discovers the properties of metals that he heats and shapes from an alloyed form? In this space age, the effect of heat on metals is fantastic, and it has been said that our future is wrapped up in hot metals. Then, too, there is the experience of interpreting ideas expressed by designers and engineers and the need to express ideas through the medium of drafting. To beginners, drafting is a foreign language; to people working in the production process, drafting is a universal language.

What about the mathematics of drafting cams and gears? Is this application of previously gained knowledge unique to industrial arts? We view with alarm a trend in some cities to cut down and even drop formal drafting. Some programs offer planning as a substitute, but planning is not drafting.

What about the understanding gained of the manufacturing industries through pattern making, foundry, machining, and fabrication by welding? What about the appreciation of the written word as learned through quantity production of printed matter in graphic-arts courses?

We seem to believe that the unfolding of our economic dependency on exclusively electricity, electrical products, and electronics is unique.

What about the science that is discovered when a board warps or checks? What causes stain to penetrate wood? What action takes place during the etching process? What principles are involved in levers, wheels, and pulleys? These are the same principles that cross many areas of information taught in the shop.

These are all unique to industrial arts but only when we stress our kind of information and our kind of accuracy as taught in our courses. Our courses teach a skill accuracy that is *coupled* with mathematical accuracy. We are unique only when we stress proper work habits with our kinds of materials, tools, and machines, *coupled* with safety, orderliness, and skill development. We are unique

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Basic Principles of Paper Cutting

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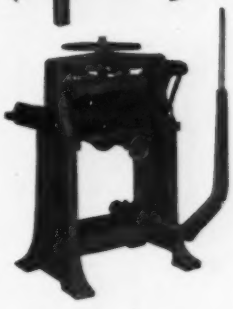
Every pupil in your graphic arts section needs (1) a thorough understanding of paper cutter operation and (2) a complete awareness of the importance of proper handling of paper cutting machinery.

Chandler & Price Paper Cutters are engineered to meet all the requirements for safe operation by students and have been standard equipment in schools for many years. If you have an out-dated or unsafe cutter in your school shop or are planning the purchase of a new one, your first consideration should be a school-approved C & P Cutter.

19½" and 23" Bench Model Lever Paper Cutters

Here is a small size lever paper cutter particularly suited to school shops where accurate cutting is required but where sizes of jobs do not require a larger cutter. A simple, two-handed safety lock removes practically all chance of injury to operator. Knife cannot fall accidentally nor cutting handle be pulled down until safety lock is held open by operator's left hand at the start of each cut.

Designed for mounting on bench or cabinet, this cutter may be purchased with or without the stand shown in the photograph.



Craftsman 26½" Lever Paper Cutter

The many exclusive features of this cutter make it the most popular cutter for school use. A two-handed safety lock prevents operation of the cutter until safety lock is held open by operator's left hand. The compound leverage action of the knife pull down makes cutting easier. A counter-weight balances the knife bar. A double-grip safety control which requires the use of both hands during the cutting cycle is available as extra equipment.

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Complete descriptions of any of these cutters are available. See your C&P dealer or write us.

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only when we apply the science and math *within* our range of information.

In most of our subject areas, individual projects, completely planned and completely built by students, seem to be the rule. What is so "industrial" about this procedure? Where and how do we study occupations, receive orientation in production, and learn how goods are made? Where do we see an honest attempt made to study what is industry? Are we industry in name only? Perhaps we should seriously teach industry, not all of the time and not in every class, but, surely, part of the time and in some of the classes.

One of the most successful programs we have seen is a class in production woodwork which has been operating for many years. In this class, numerous quantity production pieces are scheduled for production. Boys study their manufacturing problem, design and fashion jigs needed, compute costs, set up a production line, assign jobs, and produce articles in quantities as ordered. And, this procedure can be done in other areas.

Does this sort of activity have a place in our curriculums? We think it has if we are truly trying to live up to our name and emphasize industry. Perhaps we should determine a grade level at which a student's school experience would teach him about industry for at least one semester. This could involve some practice with some sort of simple class project involving production methods. The purpose would be to teach a student accuracy, interchangeability of parts, material and machine schedulings and their coordination to meet the demands of industry. The article, "1903 Delton," published in SCHOOL SHOP, June 1960, is an excellent project for this level and this type of industrial-arts offering.

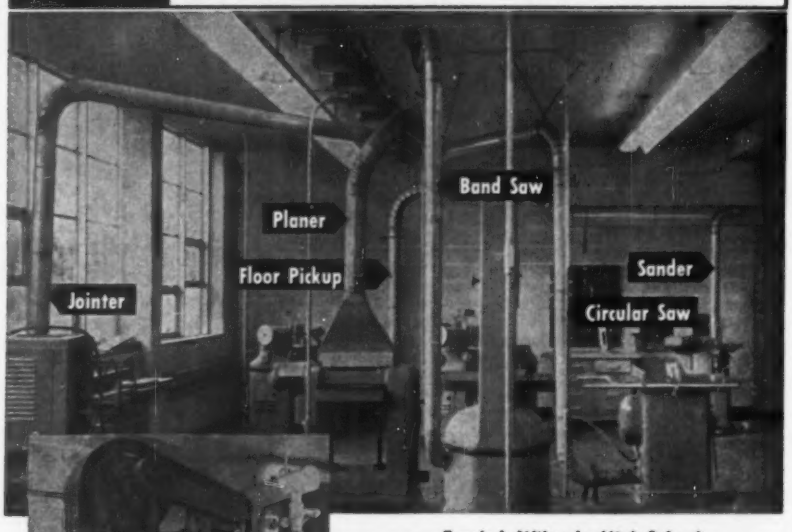
An industrial-type practice, which has received altogether too little publicity and should receive more, is the contract method of teaching. In this method, the teacher and pupil enter into written contracts for various projects, units, and lessons. The contract covers plans, schedules, research, drawings, materials, and written reports. Even the grade is contracted for in advance. Time is also a factor.

A student who wants an *A* under the contract method contracts to earn that grade by doing a complete job, including research, development, and design. If he meets all of the specifications and standards in time alloted, he earns his "pay." Lesser grades are also contracted for, but nobody is ever paid more than he has contracted to earn. This is life, this is business, this is different from ordinary shop teaching practice, and, it seems to us, it's good industrial arts.

Before very long we are going to have to reevaluate our shop offerings. Some areas of instruction are going to have to go by the boards to make way for other offerings. Perhaps some courses will have to be combined. We will have to adjust, and change course content quickly and often from now on. To adapt what seems necessary to the new, we must drop some of the obsolescent.

We must carefully analyze the amount of drill necessary to start skill development. We have to know when practice is real practice or when it is just busy work. To maintain our position in the 60's, we must merit the role of teaching industrial arts. We will only if we insist on being our unique selves by teaching *industrial* arts and not parts of a lot of other areas. ★

OBP ENGINEERED DUST CONTROL SYSTEMS FOR SCHOOL SHOPS



This combination filter-collector is located in the storage room, completely isolated from the working area of the shop. The use of filter bags in this collector permits all heat to be retained in the building.

Frank J. Wiley Jr. High School
Cleveland Heights, Ohio

"A dust collection system is a 'must' in a modern shop. It results in safety for the operator around the machine, provides clean air to breathe, and keeps the floor free of slippery chips and dust."—Mr. James F. Nemastil, Chairman, Junior High Industrial Arts, Cleveland Heights, Ohio.

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KINKS

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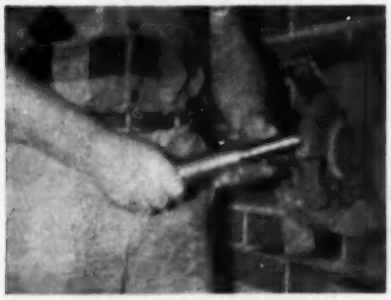
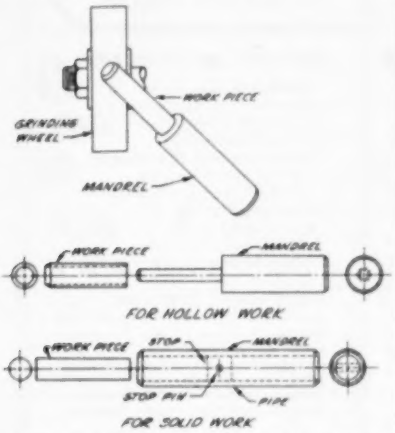
Rough Chamfering Short Pieces



A technique that we have found convenient for rough chamfering short pieces of tubular or solid round stock quickly—avoiding setting up in a lathe—follows:

Turn down a mandrel that has a good hand hold so that it will go inside of the work piece. The mandrel should be turned down to a square shoulder, and it should not go completely through the work piece either. The fit is not important unless great accuracy is desired. However, the work piece must even then turn freely inside of the mandrel.



The work piece, after it is placed over the end of the mandrel, is held against a grinder at the angle that the operator wishes to chamfer. The piece should be held slightly to the side so that the force of the wheels holds the piece against the shoulder of the mandrel. The grinding wheel will turn the work piece and grind the chamfer quickly.

For more accurate grinding, a fixture to hold the mandrel can be set up. Short springs, such as valve springs, are quickly cleaned by placing them on a mandrel such as illustrated and then buffing them with a wire wheel. Solid pieces can be chamfered for threading or other purposes by placing them in a pipe of the proper diameter, with a stop inside of the pipe for the work piece to turn against. *—L. P. West, George C. Wallace Vocational Trade School, Napier Field, Dothan, Ala.*

A Neat Trick

To drive screw eyes, cup hooks, and L-hooks easily and rapidly, cut a slot in the end of a piece of 5/16" steel rod. Slip the rod over the screw eye and chuck the other end of the rod in a hand drill and go to work.—*C. Wayne Close, Glendale, Ore.*

Put Those Jokes to Work

How often have you gotten a chuckle from cartoons printed in SCHOOL SHOP as well as other publications? Brighten up your classroom with a bulletin board for these drawings. They are not only amusing but many times they reinforce shop rules and regulations.

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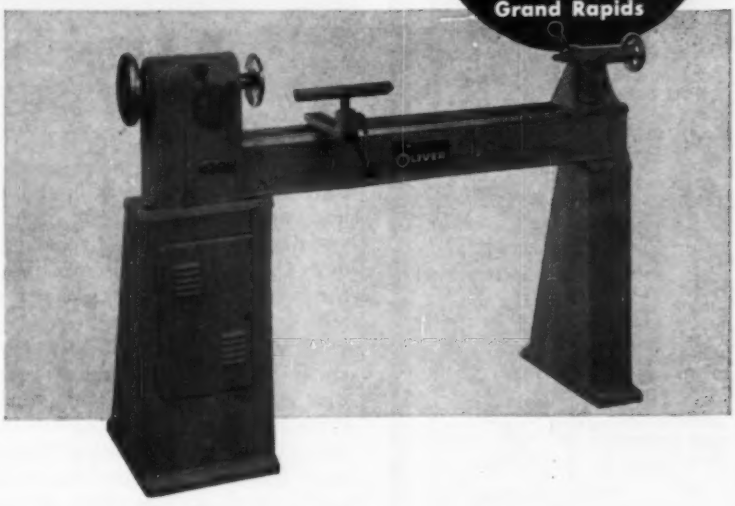

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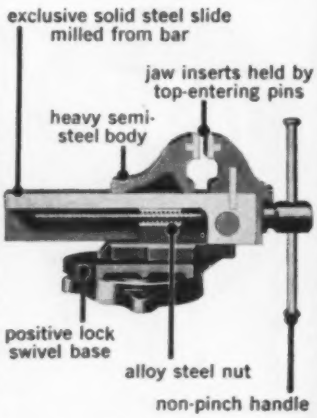
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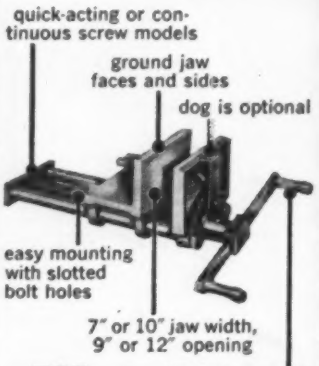
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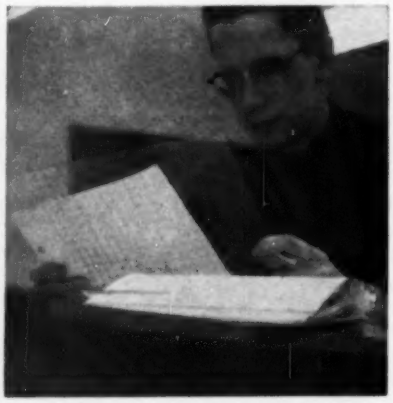
board can be made from several pieces of colored construction paper outlined with string, wood shavings, etc. If the cartoons are pinned to the board, they can be changed frequently without having to change the entire board.—*David W. Martin, Banning, Calif., Union High School.*

A Shop Pattern Aid

Quite often the shop instructor has the problem of reducing or enlarging drawings from a small photo or sketch in a textbook. Naturally, he uses



graph paper or will draw his own graph paper, using a suitable size of grid block to meet his enlargement needs. This system is very satisfactory except that sometimes he wants to copy a pattern from a book and does not want to mar the book page (especially library books) by having to draw the necessary grid cross lines on the book page over the desired pattern.

To overcome this difficulty, I have cut 1/16" thick plastic into two pieces that are 8½" x 11". Then I drilled three holes in each so they would fit a standard, ring-type project planning notebook. After they had been cut to size, drilled, and the edges polished, I scribed lines into the plastic to form necessary graph grid squares. One sheet was scribed with ½" squares and the other was scribed with ¼" squares. Then, a coat of black paint was rubbed into the scribed lines to make them more legible.

To use this device, it is necessary only to lay it over the pattern or object that you want to copy or enlarge, and there will be no marks on the page when the copying job is done. — *Robert J. Mouser, South Union High School, Uniontown, Pa.*

[Send in your Kinks to the Editor of SCHOOL SHOP, 330 Thompson Street, Ann Arbor, Mich. Payment will be made on publication.]

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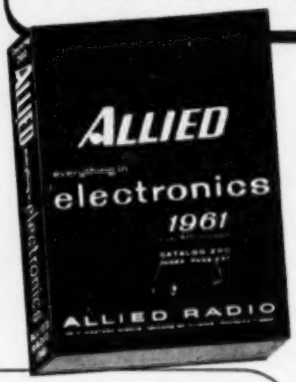

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A dandy project for eighth- and ninth-graders

A Contemporary Magazine Rack

By Roland Bacon

George Washington High School, Danville, Virginia

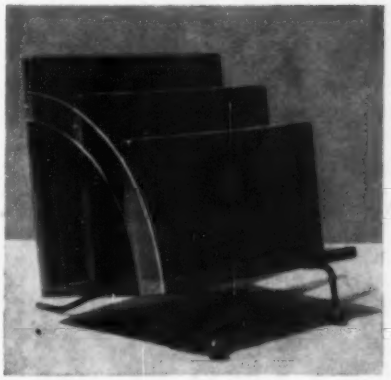
THIS project follows the characteristics of contemporary design in that it makes use of several materials rather than one and also because of its simplicity of lines and construction. It may be called a general shop project because several teaching areas are used in its construction. However, the woodworking shop has enough facilities to do the job.

This design has evolved after considerable experimentation with various ideas. Still present is the opportunity for the utilization of original design ideas and construction. Wood or metal can be substituted for the plastic.

Industrial-arts students like to make this project and it can easily be done by the average eighth- or ninth-grader. A suggested procedure for making this magazine rack follows:

Square the stock and glue it edge to edge. Lay out the wood; cut and fit the rabbet and dado joints. Assemble with screws. Sand and finish the wood parts. Turn the feet on a lathe and drill holes for screws and counter sink (see photo).

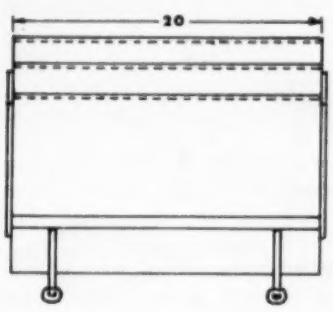
Determine length of iron needed for legs. Cut iron rod to length with a hack saw. Smooth ends and flatten

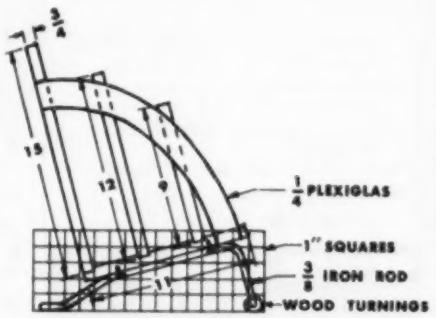


those parts of the rod that are to be drilled to receive screws. Draw a full-sized pattern or template for shaping the rod used for legs. Form the legs with a bending jig or in a machinists' vise. Smooth rod with emery cloth. Mark holes for screws with center punch. Drill screws and counter sink. Finish with flat black lacquer or paint.

Lay out pattern for the plastic sides. Saw the plastic on a jig or band saw. File, sand, scrape, and buff the plastic supports. Drill screw holes.

Now, assemble the parts, and you have a contemporary magazine rack with high take-home value. ★





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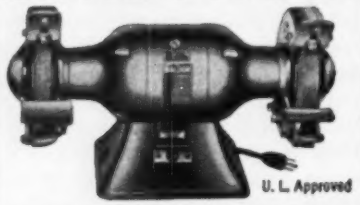

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happenings in industrial education

State Associations

STATE industrial-education associations were busy during the fall months. Many held their annual convention and election of officers. Some of the highlights of their activities follow:

Virginia Industrial Arts Association: Ivan Hostetler, president of the American Industrial Arts Association, was featured speaker at the convention held in Richmond in November. During the business session, Joseph A. Schad, Virginia Polytechnic Institute, was reelected president for a two-year term. Other officers named were: Ralph Lewis, first vice-president; Frank West, second vice-president; and Virgil Harris, secretary-treasurer.

New England Industrial Arts Teachers Association: John B. Nay was elected president at the association's twenty-third annual convention held in October at Wentworth-by-the-Sea, Portsmouth, N.H. Edmund Medeiros was named vice-president; Edward P. Stach, secretary; and H. Manghue, treasurer. George Koenig, head of naval training, Bureau of Ships, Washington, D.C., gave the banquet address on "The Collapse of Time." Next year's convention will be held in Rhode Island.

Iowa Industrial Education Association: Donald Maley of the University of Maryland and J. Bruce Buckler of International Business Machines were principal speakers at the annual convention held in November in Des Moines. Francis Burnham, Marshalltown, was elected president for the current year. Durwood Miller, Eagle Grove, is vice-president; Leonard Bengston, Ames, is secretary; and Al Sherrick, Iowa State University, Ames, is treasurer.

Minnesota Industrial Arts Association: Officers for the association for 1960-61 and 1961-62 are: Gerald L. Steele, Orono (Long Lake), president; Loie Grandprey, Windom, vice-president; Horace M. Mayo, Southwest High School, Minneapolis, secretary; and James D. Nygaard, Onamia, treasurer. Alfred Lease, Saint Cloud State College, is executive secretary.

Indiana Industrial Education Association: Newly elected officers are:

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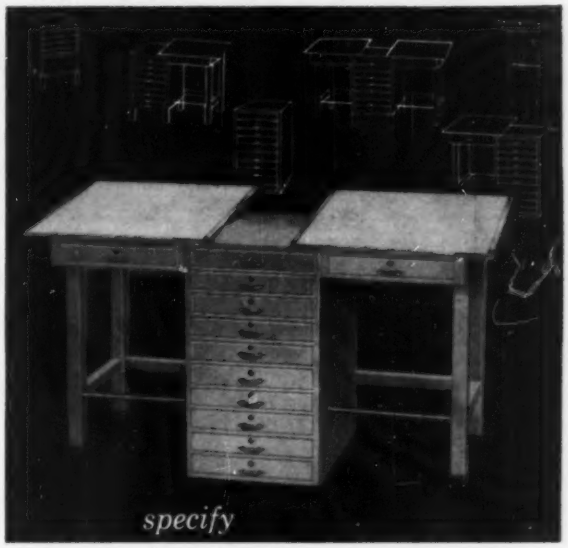

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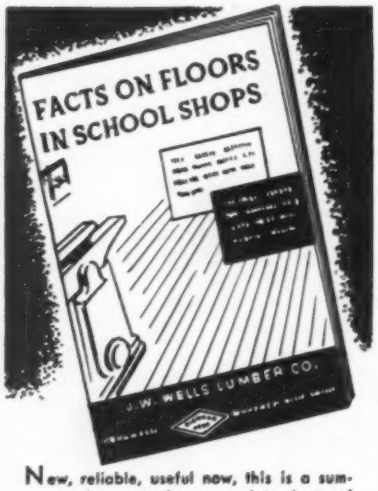

New, reliable, useful now, this is a summary of reports from superintendents of 57 major school districts on the kinds of floors they now have — floors they prefer, — for each of 8 major shop areas, woodworking, metalworking, printing, etc. (Survey made by Industrial Arts & Vocational Education Magazine, 1959.)

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Frank G. Moore, Kokomo, president; Lewis Yoho, Terre Haute, first vice-president; Leon Hunt, Indianapolis, second vice-president; and A. A. Himelick, Kokomo, secretary-treasurer. The association will hold its annual convention, April 6-8 at French Lick Sheraton Hotel, French Lick.

Oregon Industrial Arts Association: The fall conference held in November in Portland highlighted a symposium on "New Horizons" led by the heads of the departments of industrial arts in Oregon and Washington colleges. The conference was said to be the most professional ever held by the association. A scramble session also was held during the conference on such topics as contemporary coppersmithing, metalizing, coring without baking, lost wax, tile setting, sticking wood to metal, and shocking experiences in junior high. Dee Green, Salem High School, is president of the association.

New Graphic Arts Society

A Graphic Arts Society is now in the process of being organized at Western Michigan University, Kalamazoo.

Purposes of the organization are to promote interest in the graphic-arts industry among high-school students, to help members keep abreast of new developments in the industry, to develop fellowship among printing students, and to assist members in job placement on graduation.

CONVENTION CALENDAR

Illinois Vocational Association, Chase-Park Plaza Hotel, St. Louis, Mo., Mar. 2-4

New Jersey Vocational & Arts Education Association, Berkeley-Carteret Hotel, Asbury Park, Mar. 9-11.

California Industrial Education Association, Fresno, Mar. 17-18.

Ohio Industrial Arts Association, Neil House, Columbus, Mar. 23-25.

American Industrial Arts Association, Chase-Park Plaza Hotel, St. Louis, Mo., April 4-7.

New York State Vocational and Practical Arts Association, Mark Twain Hotel, Elmira, April 6-8.

Indiana Industrial Education Association, French Lick Sheraton Hotel, French Lick, April 6-8.

Missouri Industrial Educational Association, University of Missouri, Columbia, April 14-15.

Michigan Industrial Education Society, Civic Center, Lansing, April 20-22.

Connecticut Industrial Arts Association, Central Connecticut State College, New Britain, May 5-6.

Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

What's in a Name?

TEACHERS *A* and *B* were engaged in the popular activity of discussing the numerous problems they encountered in their shop classes. *A*, who presided over the wood department, complained that he was having difficulty in having his pupils memorize the names of the parts of a plane. *B*, who taught in the machine shop, replied that he had similar trouble when he attempted to have his pupils memorize the numerous parts of a lathe. Both of them were aware that the authors of their textbooks provided pictures of equipment with the names of the various parts arranged around the pictures and indicated by appropriate arrows. They felt that this was good, but they questioned the desirability of requiring the pupils to memorize these names.

Both teachers were of the opinion that one of their main objectives was to train the pupils to operate the equipment effectively. If pupils knew the names of the various parts of the equipment, so much the better, although they did not consider this knowledge essential.

Notwithstanding this feeling on their part, it annoyed them to hear one pupil announce to another that, to operate the particular piece of equipment he was using, all one had to do was to push this "hickey" and pull this "do-funny" and the "gadget" was ready for use.

We are in sympathy with *A* and *B*, and we deplore the fact that terms such as these are heard so frequently in our school shops. However, we must consider the relative importance of the practice before we condemn it. How many people who drive an automobile know the correct names of the various parts of the machine they control? There are many who are unable to distinguish between a fan-belt and a rear axle. We would venture to say, also, that some of them are unaware that there is a fan on their car. Yet they may be excellent drivers.

Then, too, how many expert machinists could give the correct book names of the component parts of a machine lathe? And how many cabinetmakers or patternmakers would be able to point out the cam or the frog of a plane? These individuals may have other names for the parts and they are thoroughly familiar with the function of them. The important thing is that they can operate the equipment effectively. It is granted that it would be a fine thing if they knew the book names of the various parts of their equipment, but, to them, this knowledge is relatively unimportant.

Since we believe this to be true, we are wondering why *A* and *B*, and many other teachers, spend so much time on the memorization of names, thus robbing the pupils of the time they might devote to improving the facility with which they can use the equipment.

It is likely that the point of view expressed above will be unpopular, but it may suggest to *A* and *B* that there are others who recognize their difficulty. Then too, it may cause them to change the emphasis they place on relatively unimportant matters, and bear down on others that are more significant. ★

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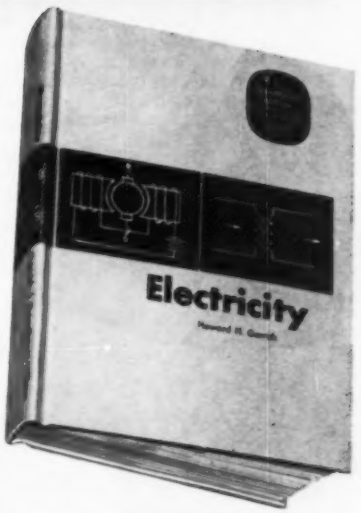

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  Associate Professor, Industrial Education, University of Missouri, Columbia
- ☐ **ELECTRICITY** by Howard H. Gerrish
  Assistant Professor, Industrial Arts, Chico State College, Chico, Calif.
- ☐ **ELECTRONICS** by Howard H. Gerrish
  (companion book to Electricity, starts with vacuum tube)
- ☐ **METALWORKING** by T. Gardner Boyd
  Director, Industrial Arts, Public Schools, Kansas City, Missouri
- ☐ **GRAPHIC ARTS** by Fred D. Kagy
  Professor, Industrial Arts, Colorado State College, Greeley
- ☐ **ART METALS** by C. Vernon Siegner
  Assistant Professor, Industrial Arts, Colorado State University, Ft. Collins
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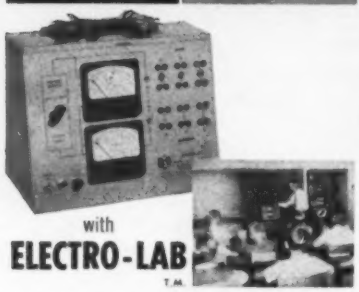

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Edgar P. Westmoreland, supervising director of trade and industrial education in the District of Columbia public schools for 22 years, has retired. An educator for 42 years, Mr. Westmoreland served as U. S. Office of Education specialist in war-production training and with the International Cooperation Administration in Indonesia. He is succeeded by **Robert J. Volland,** formerly special assistant, Department of Industrial and Adult Education, in the D. C. schools.

Robert Rice, former Wayne State University Contract Team staff member for development of the Bangkok, Thailand, Technical Institute, has been appointed dean of the faculty at Hampton Institute, Va.

Arthur Neiger has joined the industrial-arts faculty at Northern Michigan College, Marquette. He formerly taught at Pellston, Michigan.

R. Lee Hornbake, former professor of industrial arts and department chairman at the University of Maryland, College Park, has been appointed vice-president for academic affairs at the University.

Ronald J. Baird and **Philip D. Wynn** have been named to the staff of the department of industrial arts at Ohio University, Athens.

Daniel J. Crowley, member of the industrial-education staff of Bowling Green State University, Ohio, since 1919, has retired. He is succeeded in teaching graphic arts by **Robert Austin.**

W. M. Ramsey has been appointed acting chairman of the department of industrial-arts education at Miami University, Oxford, Ohio.

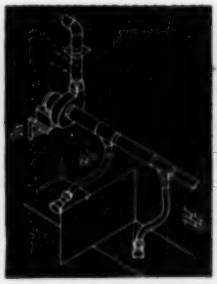
John S. Carpenter is now state director of trade and industrial education for Delaware. He was head of industrial education at Virginia Polytechnic Institute, Blacksburg, Va.

Wilmot F. Oliver has been named state supervisor of vocational teacher training in New Jersey.

Arthur P. Twogood, teacher trainer in trade and industrial education at Iowa State University, Ames, since 1937, died Nov. 22 at 65. For 15 years prior to joining the ISU staff, he had been supervisor of industrial education at Newton High School. He had taught industrial arts at Brooklyn, Marion, and Iowa City, all in Iowa. He was one of the organizers of the Iowa Industrial Arts Association, forerunner of the Iowa Industrial Education Association.

Eugene J. Robinson, formerly supervisor of industrial arts for Dayton, Ohio, schools, died recently. He taught several areas of industrial arts for 24 years in Dayton. He retired as supervisor in June 1959.

Earl Ross McAtee, executive vice-president of Barret Equipment Company and former automotive instructor at the David Ranken, Jr., Trade School in St. Louis, Mo., died in December at the age of 60. Prior to joining the Barrett firm, he was senior training officer for the Veteran's Administration. ★



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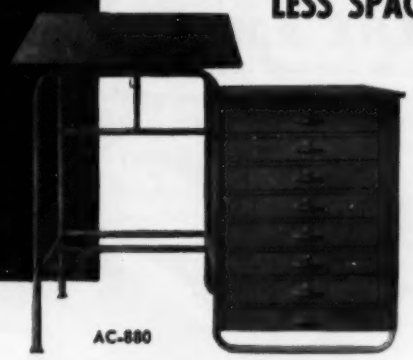

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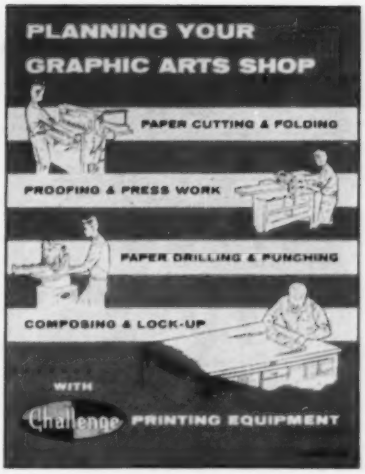

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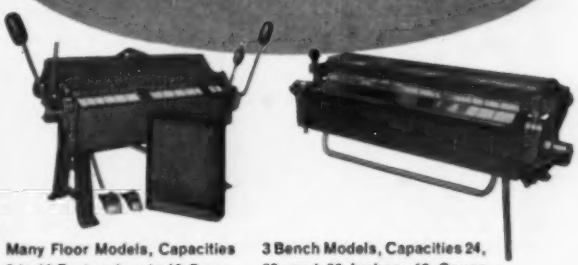

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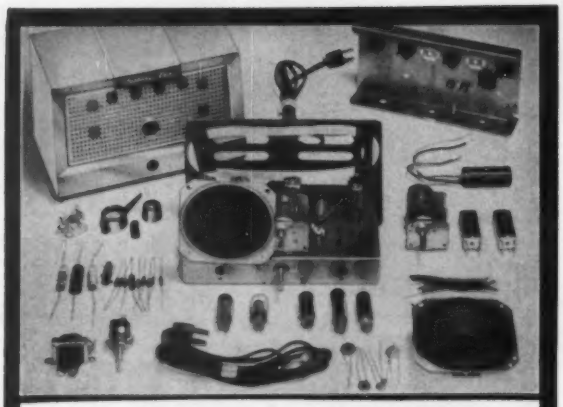

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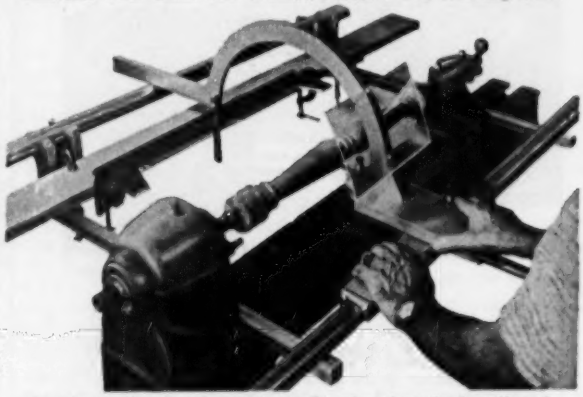

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News ABOUT TRAINING

The Technician

Survey in New Jersey Reported

A survey concerning technician education and needs in Syracuse, New York, and Onondaga County has been recently made in that area.

In Syracuse, it was learned, the community needs a technical-education program to meet a shortage of technicians as well as to extend opportunities to high-school graduates. Industries there are having difficulty at present finding qualified technicians from anywhere in any quantities. Furthermore, local educational resources for training technicians are inadequate. Eight times as many parents would rather encourage their youngsters to attend a local school than have them leave home for such training. Seventy percent of the voters surveyed favored establishment of a public, two-year, post-high-school technical school in Onondaga County, the county in which Syracuse is located. The survey showed, too, that local industries favored establishment of such a school. As for there being enough students immediately available to be trained in a two-year, post-high-school technical school, the survey showed that at the senior level in high schools throughout the county there definitely are enough interested students to not only make such a school worthwhile to operate, but to also provide minimum students to meet forecast needs of present industry for industrial technicians.

Most needed technicians, the survey showed, are in the mechanical and electrical fields. Needless to say, the need is immediate.

The survey sponsored jointly by the Onondaga County School Boards Association and the Onondaga County Board of Supervisors, recommended the following:

1. Immediate expansion of Syracuse Central Technical High School to serve the entire county.

2. Immediate creation of a summer program of technical education to supplement day-school offerings, converting Technical High School to a 12-month, full-time facility.

3. Immediate extension and expansion of the three-year, adult-education program for technicians that is now in operation.

4. Immediate doubling of the present day-school technical enrolment at Central Technical High School.

For the future, the survey recommended creation of an Onondaga County School of Technology offering a two-year, public, post-high-school, technical-terminal education program to qualified students, "building on existing foundations of faculty, facility, experience, and citizen and industrial support."

Copies of the Syracuse survey, conceived by the Syracuse Board of Education, are not available for general distribution.

From The United States Office of Education

THE National Science Foundation has issued a publication titled *Scientific and Technical Personnel in American Industry*. This is a report of a survey made in 1959 by the Bureau of Labor Statistics in which estimates were obtained of the number of scientists, engineers, and technicians employed in industry and the number of com-

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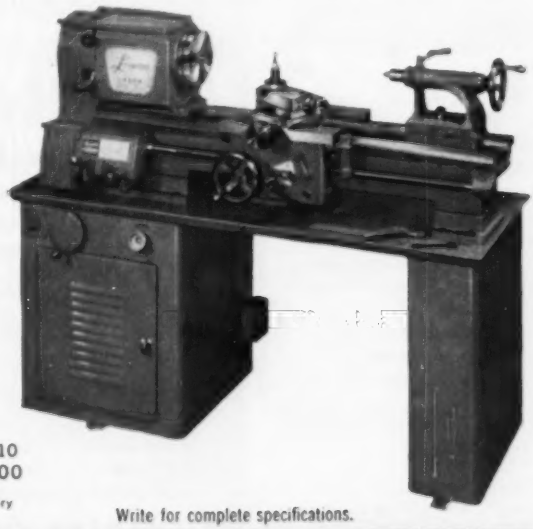

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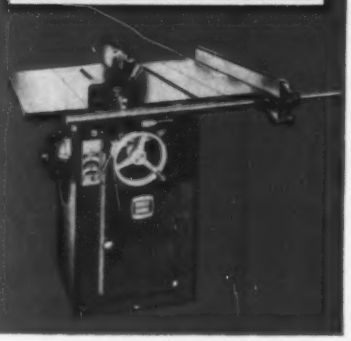

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panies utilizing such personnel, and the breakdown by industries and occupational groups. The report shows that of the 549,000 technicians employed in private industry within the coverage of the survey, 45 percent are engineering and physical-science technicians; 35 percent are draftsmen; 4 percent are medical, agricultural, and biological technicians; and the remaining 16 percent are in various types of other activities.

The bulletin, NSF 60-62, is for sale for 45 cents by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

Wisconsin Issues Bulletins

THE Wisconsin State Board of Vocational and Adult Education, C. L. Greiber, director, has recently issued a series of reports that are designed to assist in the establishment of post-high school technical institutes in that state.

Titles of these bulletins follow:

Technical Institutes in Wisconsin — General Standards; Development of the Course Outline; Program in Technology; Program in Human Relations; Program in Electronics; Program in Civil Technology; Program in Mechanical Technology; Program in Highway and Allied Construction; and *Highway Engineering Aides.* ★

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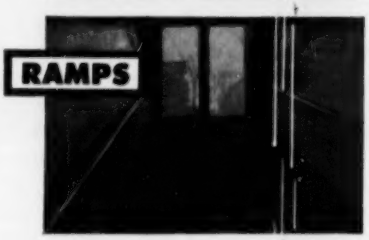

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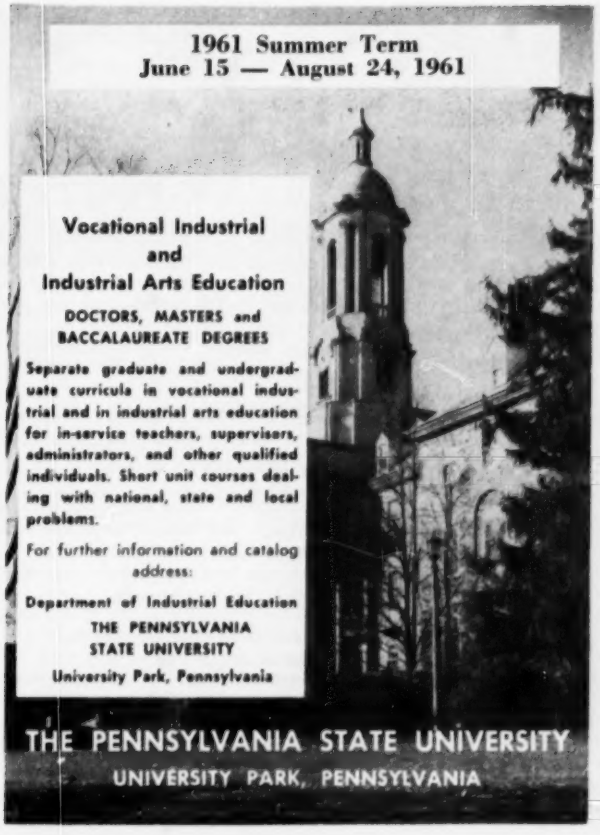

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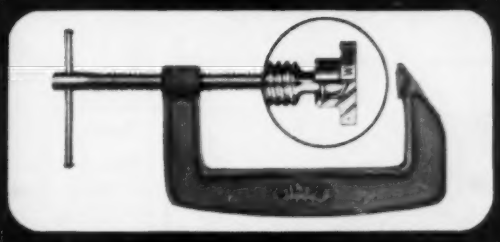

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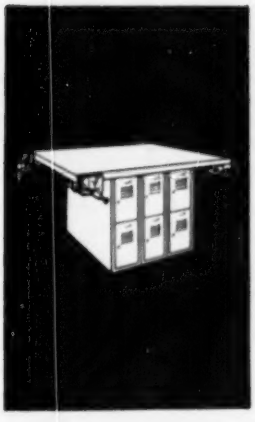

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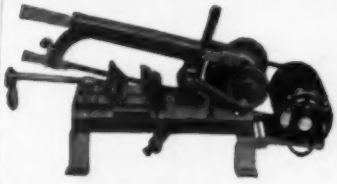

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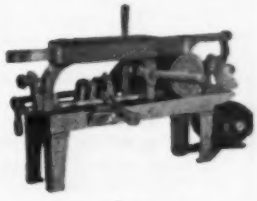

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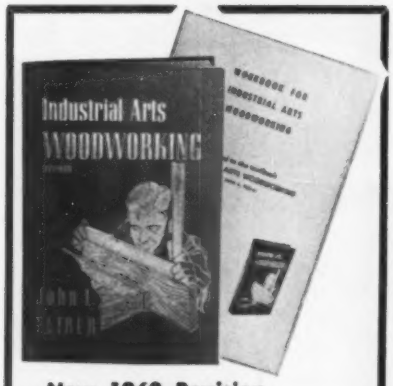

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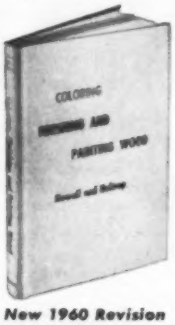

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Books:

Sheet Metal Pattern Drafting and Shop Problems. (Second Edition.) Daugherty and Powell. Peoria, Ill.: Chas. A. Bennett Co., Inc., 1960. Pp. 185.

In this edition, an effort has been made to make the book more complete. Additional problems have been included, and a new chapter has been introduced which deals with heating, ventilation, and air-conditioning layout.

In all instances where changes have been made, the idea has been kept in mind of assisting the student or the sheetmetal worker to become more proficient in analyzing the problems that appear in sheetmetal layout work.

Students will find that the sequence followed in presenting the various principles involved simplifies the task of developing skill in this work. Apprentices, journeymen, and foremen in this field also will find the book to be helpful as a reference.

John S. Daugherty is a member of the faculty in the College of Industries, Carnegie Institute of Technology, Pittsburgh, Pa. Robert E. Powell is on the staff of San Jose, Calif., Junior College.

Technical Illustration. Thomas. New York: McGraw-Hill Book Company, Inc., 1960. Pp. 149. $6.50.

The practical techniques used in technical illustration are presented in this book. The basic procedures followed in industry in making three-dimensional drawings are discussed, and actual industrial methods and problems are used throughout.

It may be used as a classroom text for beginning or advanced students, and it will serve also as a handy reference or handbook by others who have a professional interest in the subject.

T. A. Thomas teaches technical illustration in El Camino College, Calif., and has had considerable experience as an illustrator for several industrial concerns.

Tube Substitution Handbook. Vol. 1. Indianapolis: Howard W. Sams & Co., 1960. Pp. 96. $1.50.

The first section of this book lists all receiving tubes that have been, or are being, manufactured in this country. There are included also several tubes which have been registered with EIA but are not yet in production.

In section two, these tubes are listed in the left-hand column. Opposite each one, in the right-hand column, those substitutes are listed which have similar or improved characteristics and can be inserted directly into the socket. When no substitutes are shown, this indicates that none are recommended.

In section three, European substitutes for American types are listed. And in section four, American substitutes for European types are presented. In the final section, picture-tube substitutes are listed.

This book was prepared by the Howard W. Sams engineering staff.

Mechanics. (Third Edition.) Breneman. New York: McGraw-Hill Book Co., Inc., 1960. Pp. x + 262. $5.50.

This is a practical book which was written for the reader who wishes to further his knowledge of engineering fundamentals. It deals with the study of simple machines, gears, pulleys, and mechanisms.

The reader who has a limited background in mathematics should have no difficulty in understanding the principles presented.

This edition has been rewritten to conform to modern engineering practice and to make it adaptable for students on the engineering-aide level, as well as for apprentices.

John W. Breneman is professor of engineering mechanics at Pennsylvania State University, University Park.

Pamphlets:

Solar Ephemeris for 1960 and Surveying Instrument Manual is a 192-page, pocket-sized booklet on surveying instruments and their use and the Solar Ephemeris. Mathematical and astronomical tables, illustrated applications, including principles of celestial observations, are covered. Published annually by the Keuffel & Esser Company, for this 1960 issue write the firm at Hoboken, N.J.

A Selected Bibliography of Books About Jets, Rockets, and Space Exploration is an 11-page listing of titles published after 1958. All are concerned with the field of aero-space. Single free copies of this bibliography (No. OE-33002-1) are available on request. Write to the Specialist for Aerospace Education, U.S. Office of Education, Washington 25, D.C.

A Guide for Improving Safety Education Programs in School Shops, and **School Shop Safety Bibliography** are two publications available from the U.S. Office of Education. The guide (No. OE-84004) is intended to serve instructors in developing safety programs. The bibliography (No. OE-84008) would aid those doing research in this field. There is a charge of $.25 for the guide; the bibliography is free. Write to the Vocational Division, U.S. Office of Education, Washington 25, D.C.

Advanced Student Planning Book; Industrial Arts and Vocational Classes is a notebook size group of project plan sheets for student use. A second edition, it contains 14 detailed project plan forms. The book is available for $.56 from the D. Van

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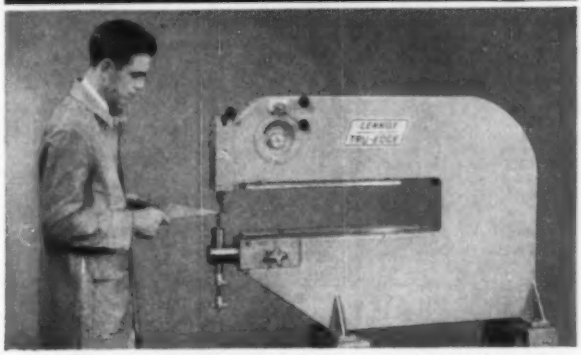

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How to Make and Use A Pinhole Camera, Teachers Edition, is a 12-page pamphlet providing instructions, diagrams, and suggested materials for construction of a pinhole camera. Ideas for several experiments involving the camera are also presented. Available free on request from the Sales Service Division, Eastman Kodak Company, Rochester 4, N.Y.

Employment Outlook for Technicians, Draftsmen is a pamphlet published by the United States Department of Labor. Part of the Occupational Outlook Report Series, the content is concerned with the employment outlook, preparation, nature of work, and earnings for technicians and draftsmen. Available for $.15 from the Superintendent of Documents, Washington 25, D.C.

Organization Management and Planning for Industrial Arts is a new 72-page, pocket-sized manual dealing with many problems of management and organization of the school shop. Written by Chris Groneman, head of industrial education, A&M College of Texas, the manual sells for $1.00 and is available from Can-Pro Corporation, 19 E. McWilliams St., Fond du Lac, Wis.

Drawing for Good Reproduction (second edition) is a 32-page manual with content stressing the elements of good draftsmanship in preparing technical drawings for reproduction. The 8½" x 11" manual is printed in two colors, and includes numerous illustrations of drafting techniques and materials. Content is designed for basic courses. Single copies are available for $1.00 from the National Association of Blueprint and Diazotype Coaters, 1925 K St., N. W., Washington 6, D. C.

Audio Visuals:

Electrical Safety in the Home is a 14-minute, sound-color film designed to alert viewers to common electrical hazards existing in the home. In story form, the film shows Tom leaving school with an electrical safety inspection sheet. Tom and Dad check their home for electrical hazards using the inspection sheet as a guide, and Dad explains the principles of electrical safety. Purchase price is $140. Available from Audio-Visual Center, Stout State College, Menomonie, Wis.

Catalog of Films on Steel Products and Uses is a 33-page, illustrated catalog of films concerned with steel. "The New World of Stainless Steel" and "Let's Build a Fence" are sample titles from the 35-title listing. All are 16mm, most are in color, and running time varies from 12 to 45 minutes. All films are available on a free-loan basis. The catalog is also free from Republic Steel Corporation, Commercial Research Division, 1436 Republic Building, Cleveland 1, Ohio.

Two Gas Welding Wall Charts show the distinctive traits of the oxy-LP gas flame in comparison with the oxy-acetylene flame. The charts, 11" by 17" and in full color, are available at no charge. Write to Public Relations Dept., Smith Welding Equipment Corporation, 2633 S.E. Fourth St., Minneapolis 14, Minn.

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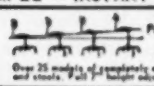

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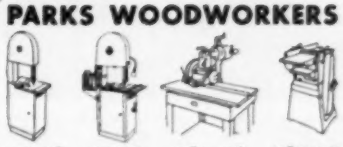

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news from Industry

(Circle the numbers on the card in this issue to secure the items listed.)

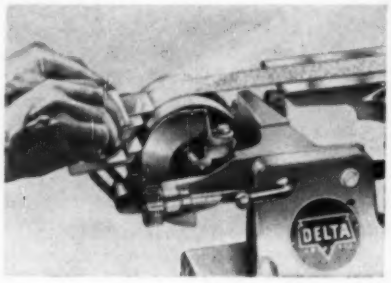
Wagner Mfg. Co. Offers Folding Drafting Table

Here is a portable, folding drafting table by Wagner Mfg. Co. that is designed for use where space conditions do not permit permanent installation of drafting furniture.

The height of the table is 29" in front and 33" in back. The top measures ¾"x 24"x32". Standard top is of plywood. A laminated basswood top is available at extra cost.

For more information write to the firm at Cedar Falls, Iowa, mentioning SCHOOL SHOP; or *circle no. M-1 on the business-reply card.*

Delta Introduces Two New Machine Products



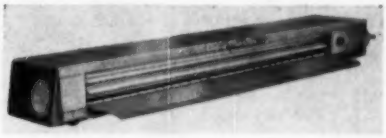
Delta Power Tool Division of Rockwell Manufacturing Company recently placed on the market a new low-cost radial drill press and a plane blade grinding attachment for the firm's belt and disc finishing machine.

According to the company, the radial drill press will drill to the center, or at any point on a 32" square, do rapid multiple drilling, and perform accurate angular drilling. The head may be positioned at any angle.

The plane-blade grinding attachment for the belt and disc finishing machine permits precision sharpening of plane blades, chisels, screw drivers, etc. According to the firm, belt sharpening of tools is easier and faster than wheel sharpening.

To receive literature concerning these products write the firm, 482 North Lexington Ave., Pittsburgh 8, Pa., mentioning SCHOOL SHOP; or *circle no. M-2 on the business-reply card.*

New "Copymaster" Developed by Copymation, Inc.

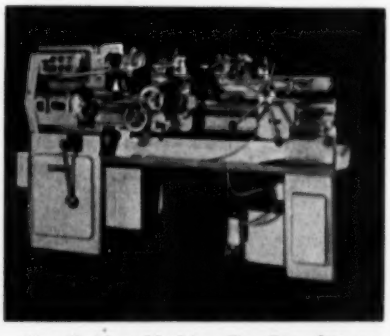


A new, compact, 44", table-mounted or wall-mounted whiteprinter has recently been placed on the market by Copymation, Inc.

Information received from the company states that design features include: variable printing speed range up to 10' per minute, controlled by a single knob featuring full reverse; a wide feed table, simplifying print feed and return; a new selfsealing chamber which processes several prints simultaneously. Dimensions are 6¼" x 9¼" x 58½".

For additional information write to the firm at 5650 North Western Ave., Chicago 45, Ill., mentioning SCHOOL SHOP; or *circle no. M-3 on the business-reply card.*

Sheldon Develops New All-Purpose Turret Lathe



The Sheldon Machine Co., Inc., has announced development of a new, ram-type turret lathe. The bar capacity of the machine is 1½", swing-over bed ways is 15", and swing-over cross-slide is 8".

The turret has six working stations, and it is mounted on precision-tapered roller bearings. All indexing parts are hardened and ground and there are hardened wear strips and a tapered gib to assure long-life accuracy.

A four-page bulletin illustrating and describing the machine is available.

For more information write to the firm at 4258 No. Knox Ave., Chicago 41, Ill., mentioning SCHOOL SHOP; or *circle no. M-4 on the business-reply card.*

King Introduces New Rubber-Stamp Press

A small, rubber-stamp press that the company claims can be easily operated by per-

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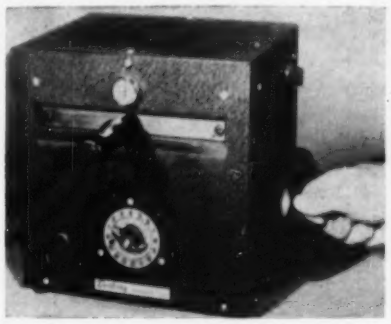
sonnel without special skills is now being marketed by the King Machine & Manufacturing Company.

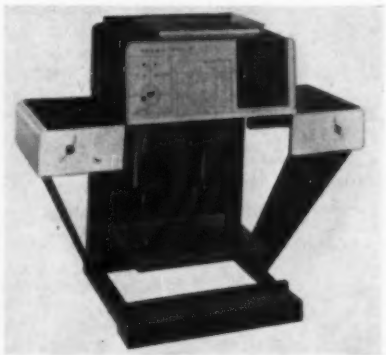


This new Berkroy press produces quality rubber stamps quickly and at low cost. Controls are simplified to effect a simple two-step operation.

The press is compact, 8" x 9" x 10", weighs 75 pounds, and operates on 110-v a-c current.

For more information about this item write to the firm at 1171 East 32nd St., Los Angeles 11, Calif., mentioning SCHOOL SHOP; or *circle no. M-5 on the business-reply card.*

New Compact Camera by Kenro Features New Lighting System

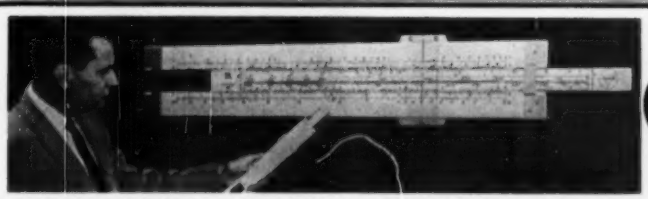


Kenro Graphics, Inc., has announced development of a new vertical-process camera incorporating a new lighting system.

According to the company, the lighting system, using four 500-w lamps, produces better quality reproduction and shortens exposure time. It also simplifies camera operation by eliminating the need to adjust lighting when the copyboard position is changed, the company reports.

The camera is available in two models, the "Vertical 18" (above) and the "Vertical 24."

For more information write to the com-



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Mesa Verde National Park, covering 98,018 acres in the s.w. corner of Colorado, contains the most notable and best preserved ancient cliff dwellings in the U. S. Mesa Verde rises abruptly 2,000 ft. above the valley floor and reaches a maximum altitude of 8500 ft. above sea level. Numerous canyons scar the surface of the mesa top and in the precipitous walls of the canyons are large caves containing the ruins of the cliff dwellings. The most notable of the cliff dwellings are Cliff Palace in Cliff Canyon, which contains more than 200 rooms and 23 kivas (ceremonial chambers) and Spruce Tree House in Spruce Tree Canyon, with 114 rooms and 8 kivas.

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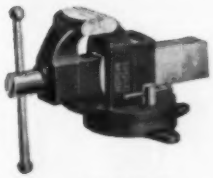

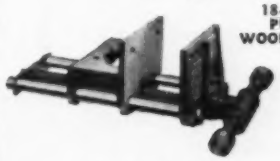

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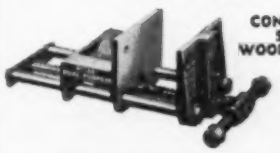

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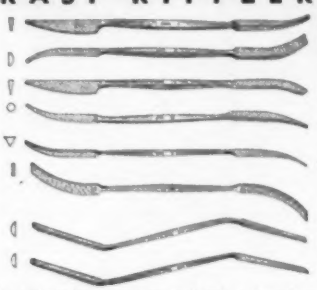

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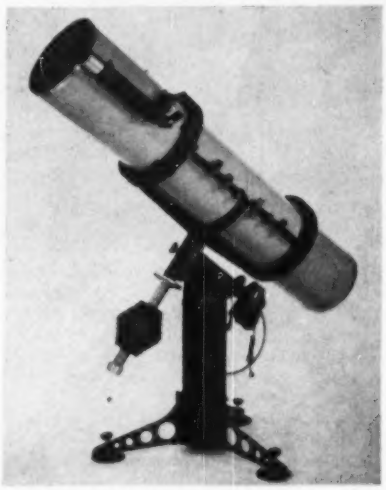
pany at Cedar Knolls, N. J., mentioning SCHOOL SHOP; or *circle no. M-6 on the business-reply card.*

Telescope Kits Now Available from Coast Instrument, Inc.



Coast Instrument, Inc., has announced that telescope kits can now be ordered at any desired stage of completion to suit individual ability and budget. Telescope parts or accessories also are available.

For more information write to the firm at 4811 Long Beach Blvd., Long Beach 5, Calif., mentioning SCHOOL SHOP; or *circle no. M-7 on the business-reply card.*

ESB Activerter Makes Portable 110-v A-c Power Possible

The Electric Storage Battery Company has announced development of the Activerter making it possible to provide 110-v, a-c from a 12-v storage battery. Four models are available ranging from 150-w to 500-w output. Power tools and household appliances can thus be operated from the 12-v battery with limitations being that electrical devices do not exceed the wattage output of the Activerter, according to the company.

Fully transistorized to reduce weight, the Activerter can also be used as a fast or slow charger for 6-v and 12-v batteries.

For additional information write to the firm at Dept. G., P.O. Box 6266, Cleveland 1, Ohio, mentioning SCHOOL SHOP; or *circle no. M-8 on the business-reply card.*

PERFECT PROJECTS

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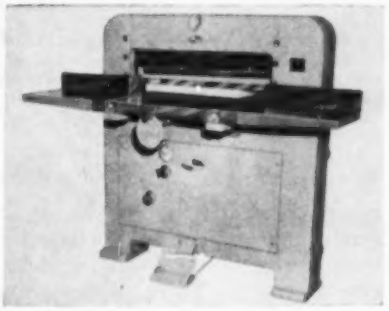
Rubber-In-Shear Machine Mounts for Quiet Machine Operation

The Hamilton Kent Manufacturing Company, manufacturers of "Rexon" machine mounts, reports that their mounts are successful in reducing noise level, and that they are being installed in new school shops.

The mounts are of X-shaped rubber or neoprene elements enclosed in steel cases. Because the mounts do not require bolting to the floor, increased flexibility of machine layout is permitted, the company reports.

For additional information write to the company at 427 W. Grant St., Kent, Ohio, mentioning SCHOOL SHOP; or *circle no. M-9 on the business-reply card.*

Challenge Announces New Power Paper Cutter

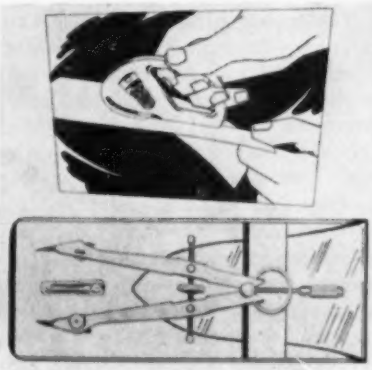


The Challenge Machinery Company is now marketing a small power paper cutter that has many operating features of large shop equipment, according to the company.

The new Challenge Champion, Model 305 MB, will handle paper 30½" wide in piles 3½" thick. It has two-hand push-button operated safety controls and foot-controlled power clamping.

For more information about this product, write to the firm at Grand Haven, Mich., mentioning SCHOOL SHOP; or *circle no. M-10 on the business-reply card.*

All-Purpose Cutter, New Bow Compass Announced by Alvin & Company



"Snippy," an all-purpose cutting implement, and a new light weight 6" bow com-

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pass are two new products being marketed by Alvin & Co., Inc.

"Snippy," a combination scissors and knife, is of one-piece, molded plastic construction. Equipped with an exchangeable standard razor blade held in place by a safe locking device, "Snippy" cuts paper, textiles, etc., along straight or curved lines.

The company describes its new bow compass as being of anodized aluminum with a steel center assembly for durability with nickel spindle caps and supporting steel parts. A rapid center wheel adjustment provides settings for circles ranging from ¼" to 9" diameter.

For more information about these items write to the firm at 611 Palisado Ave., Windsor, Conn., mentioning SCHOOL SHOP; or *circle no. M-11 on the business-reply card.*

New Literature:

Lincoln Welding School is a new bulletin outlining the program in arc welding education available at the Lincoln Electric Company. In operation since 1917, the school now offers a basic five-week course that can be expanded to over eleven weeks of training.

To receive this bulletin, write to the Public Relations Dept., Lincoln Electric Co., Cleveland 17, Ohio, mentioning SCHOOL SHOP; or *circle no. M-12 on the business-reply card.*

Washington . . . *from page 52*

language . . . which limits the use of funds appropriated exclusively for the training of individuals for useful employment as 'highly skilled technicians.' The funds appropriated under Title VIII should not be so restricted. . . ."

Doubling in a Decade. – Another report, issued just as the changeover in administrations was taking place, proposed a doubling of total expenditures for vocational education by 1970. The report, issued by the United States Office of Education after more than a year's study, was called "Vocational Education in the Next Decade."

The report cited the need for vocational education for the unemployed, school drop-outs, migrant workers, the handicapped, and other youth and adults. It suggested that the opportunity for vocational education should be made available to every person who wishes it.

In releasing the study, Secretary Flemming said he was especially impressed with sections calling for new approaches in vocational-education programs and establishment of centers for developing and testing new programs.

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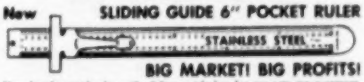

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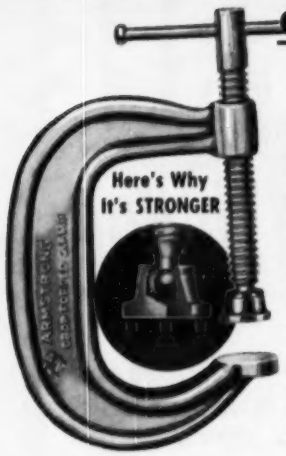

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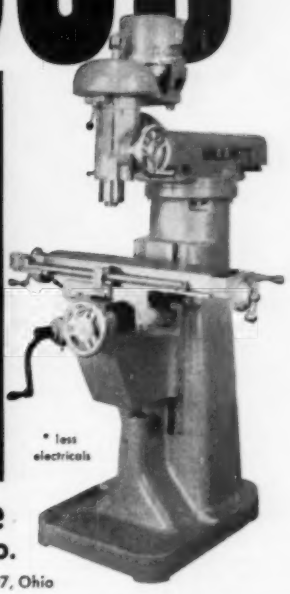

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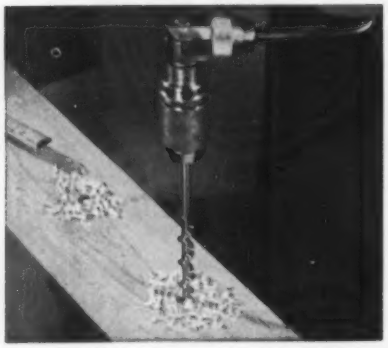

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needs in the vocational-education field today is for more experimentation and greater flexibility in the development of programs and methods," Flemming said. "The federal government has a very important role in stimulating such developments."

The report proposed:

1. A continuation, expansion, and some redirection of present categorical programs in vocational agriculture, distribution, homemaking, and trades and industry.

2. An expansion of the area programs for technicians authorized under the National Defense Education Act.

3. New programs in rural services occupations, office occupations, and for special groups, including the unemployed, underemployed, school drop-outs, persons who move to obtain employment (especially from rural to urban settings), migrant farm workers, the aging, and the handicapped. In connection with these proposals the report recommended pilot projects, national conferences, new teacher-training activities, and other measures.

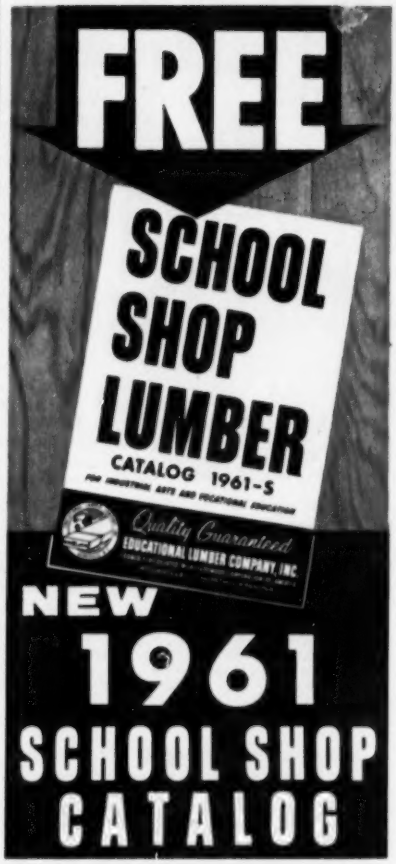
4. An increase in federal, state, and local expenditures for vocational-education programs from $267 million in 1961 to $570 million a year by 1970. The report suggested that by 1970 $109 million would be needed for the new programs alone.

Major increases projected by the report included a growth in total annual expenditure from $70 million to $104 million for vocational agriculture; from $11 million to $40 million for distributive; from $80 million to $107.5 million for homemaking; $21 million to $65 million for technicians; and from $85 million to $145 million for trades and industry.

Budget Boost. – In submitting the federal budget for fiscal 1962 to Congress, President Eisenhower called for renewal of the practical-nurse training act due to expire this year and recommended an appropriation of $4 million for the program.

Mr. Eisenhower also proposed appropriation of $33,527,000 – the full amount authorized – for vocational education under the George-Barden Act and $11.8 million – an increase of $2.8 million – for Title VIII of the National Defense Education Act.

Speaking for the officers and members of the American Vocational Association, Executive Secretary M. D. Mobley voiced satisfaction with the



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budget proposals and said they represented "as much money as the states are in a position to spend efficiently and effectively."

Mobley was optimistic about action by the new administration to further the cause of vocational education. He recalled a letter he received from Mr. Kennedy last fall in which the President declared that "the continuation of federal funds for vocational education at the full amounts authorized by existing law is vital to the security and economic health of our nation."

Mr. Kennedy was an active supporter of vocational education in Congress, and his interest is expected to carry over to the White House, Mobley said. ★

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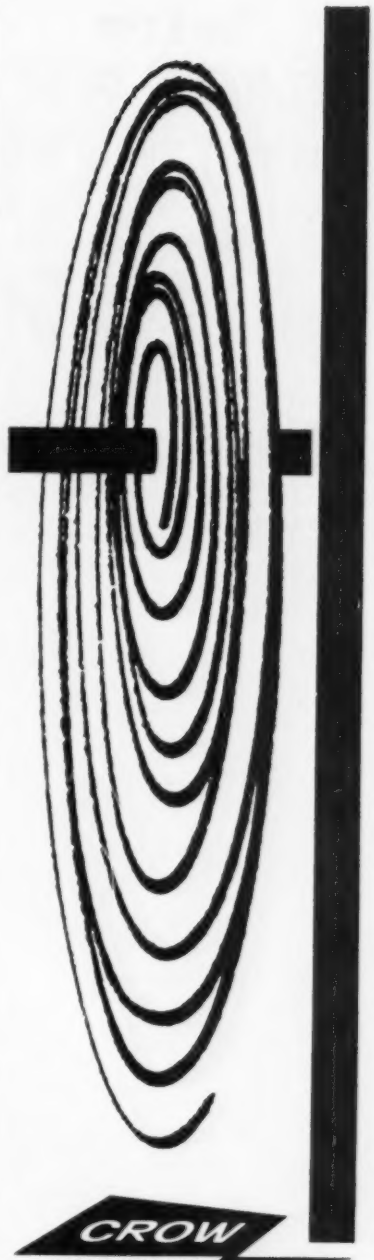

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FOR THE
CRAFTSMAN

from Washington

by Edgar Hill

(*Editor's Note*: Michael Paca, who does an admirable job of reporting Washington news of interest to readers of SCHOOL SHOP, is taking a leave of absence for a few months. His place is being taken by Edgar Hill who has had extensive experience in reporting educational news from both Washington and other parts of the nation.)

Future Needs. – At least one recommendation from the old administration to the new is likely to receive careful and sympathetic consideration.

Just a few days before leaving office, Secretary Arthur S. Flemming of the Department of Health, Education, and Welfare issued a report urging "that a representative national consultative committee be established to determine the total needs for vocational education (including the needs of public and private tax-exempt schools and institutions which provide training for technician occupations) and to recommend to the Congress legislation for modifying and strengthening vocational education to meet the manpower needs in the years ahead."

The committee, Fleming said at a press conference, should be a joint executive-legislative effort, with some members appointed by President John F. Kennedy, some by Vice-President Lyndon B. Johnson, the presiding officer of the Senate, and some by House Speaker Sam Rayburn.

The recommendation came from a consultative panel of 20 leading educators appointed by Flemming to suggest revisions of the National Defense Education Act. In reviewing Title VIII of the Act, which covers area vocational education programs, the consultants noted that when the development of vocational education began in the United States, a commission on national aid played an influential role in shaping the program.

"It seems appropriate," the educators added, "that there be a representative consultative committee to review the present situation with respect to the need for vocational education and to appraise current legislation as it stimulates the development of programs that will meet manpower needs in the years ahead."

As for Title VIII itself, the educators who reported to Flemming urged that it be continued but that Congress "authorize a broader definition of technician occupations necessary to the national defense." The effect of Title VIII, they said, should be "to supplement and strengthen existing vocational education, apprenticeship training, and retraining programs."

The clause in the present law which limits federal aid to training for "occupations necessary to the national defense" has been widely criticized by vocational educators. Flemming's consultants took note of this criticism and commented that many technologies which contribute to the national economy or to the national welfare may be considered as necessary to the national defense.

"The need for high-level technician training in such areas as agriculture, business, distribution, medical and health, construction and all areas of manufacturing, research, and development have become increasingly evident during the past two years," the report said.

"A recent study made by the Bureau of Labor Statistics for the National Science Foundation indicates that, excluding those technicians needed annually for replacement purposes, approximately 800,000 new technicians will be needed by 1975. Removal or modification of the defense limitation in Title VIII would make it possible for vocational education to contribute to the preparation of a considerable portion of this large segment of needed national technical manpower."

An even stronger appeal for broadening the vocational-education provisions of the Act was made by one of the consultants, John E. Cosgrove, assistant director of education for the AFL-CIO. In a separate statement appended to the report, he voiced general agreement but added that he would "specifically recommend that the Congress remove the restrictive

(*Continued on page* 48)

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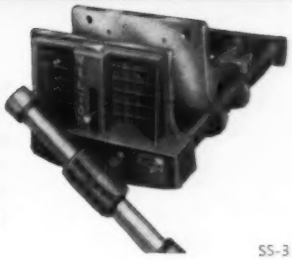

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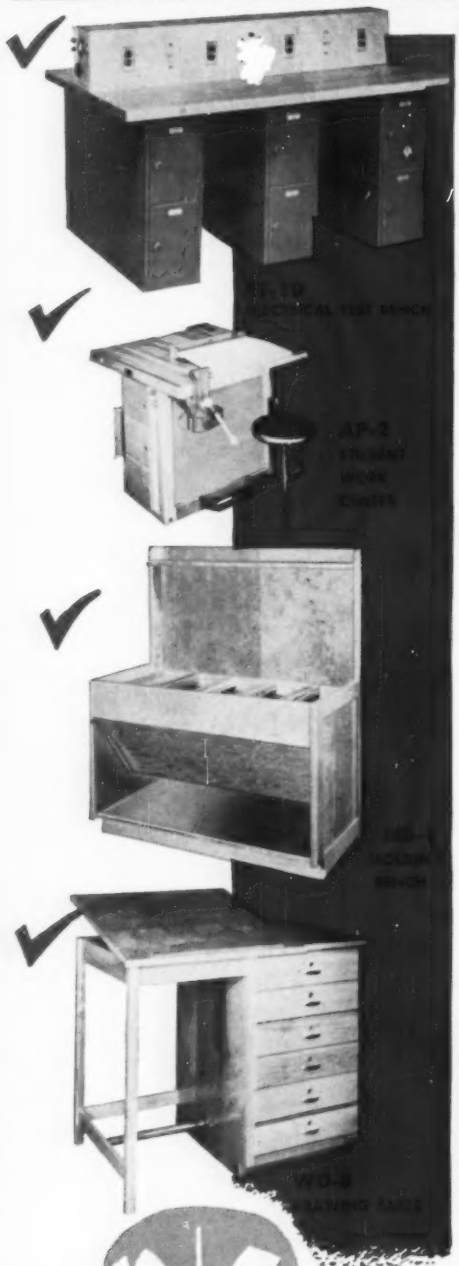

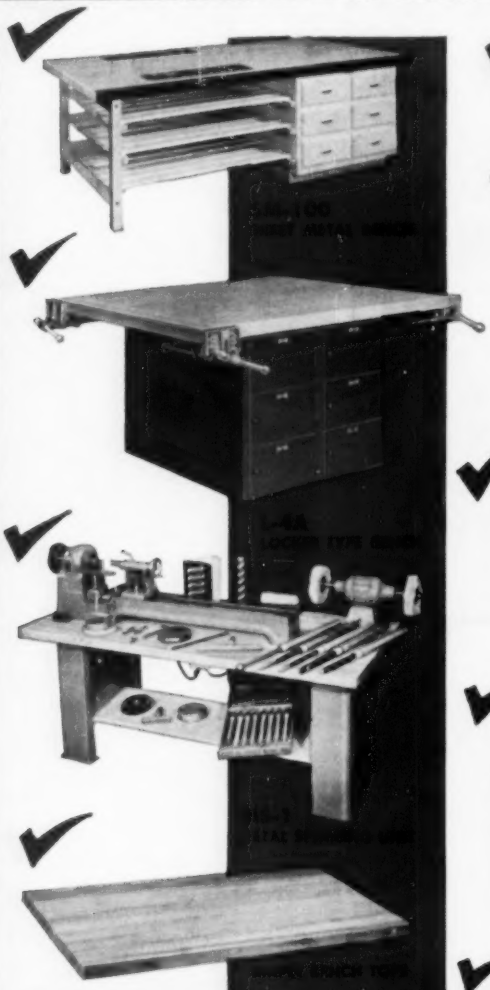

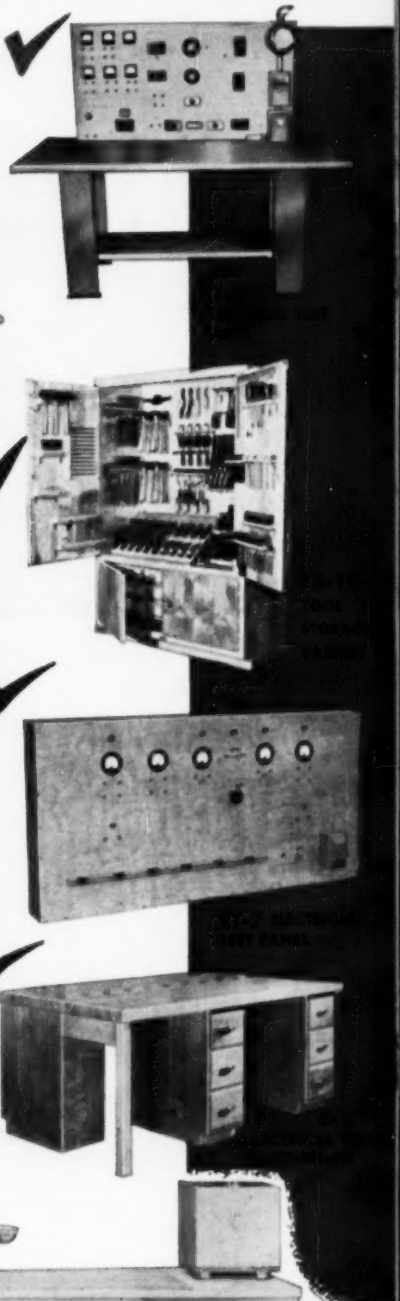

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